DRAGON

95p US\$3.25

January 1986

The independent Dragon magazine

Dragon Plus expansion

Advanced Basic programming

Dragon Joy

Nelbourne Offer!

DOUBLE YOUR DRAGON with DRAGONPLUS

Upgrade your DRAGON with an extra 66K of memory and a full size 80 by 24 video display. FLEX, DRAGON DOS And cartridge software available now. OS9 drivers available soon £103.50

Assembled and tested

(please state DRAGON 32 or 64)

Update disk for FLEX (with 80X24 and RAMDISK)

£14.95 New Year Special £14.95

DDIT + cartridge for DRAGONPLUS

EDIT + disk (DRAGON DOS only)

SPECIAL OFFER — DRAGONPLUS with FLEX/EDITOR/
ASSEMBLER/DBASIC/EDIT+

£199.99

€5.75

FLEX is the BEST

We make no secret of our support for FLEX (0*9 fanatics may skip this paragraph). It's one of the most friendly and easy to use operating systems and has been popular with 6800 and 6809 users for many years. Our implementation of the DRAGON has autorepeat, 51 by 24 Hi-Res text screen with windows, true lowercase, redefinable character sets and still leaves a full 48K of memory free for programs and data and happily uses 40 or 80 track disks, single/double

sided, single/double density.

It comes complete with a powerful text editor and one of the best 6809 assemblers available plus gives you access to lots of good professional

Available for DRAGON DOS, DELTA DOS OR CUMANA DOS

£86.25

Special Offer: FLEX/ED/ASM with DBASIC

only £99.99

DBASIC - DRAGON BASIC for FLEX

No you don't have to throw away or rewrite your BASIC programs when you move up to FLEX. Just start DBASIC and the DRAGON will run standard DRAGON BASIC programs and machine code tape programs. But that's not all — you can load/save programs, read/write data on FLEX disks, use the HIRES screen, send commands to FLEX. And there's a clever ERROR command that shows you exactly where your program went wrong. With 5 example programs plus a very useful cheque book balancing program donated by one of our satisfied customers.

DBASIC for Compusense DRAGON FLEX

EVENNEION SYSTEM

SP-EDIT — Wordprocessor with Interactive Spelling Checker

A friendly yet powerful full screen editor and wordprocessor. Turns your DRAGON into a wordprocessing system which shows you how the text will appear on the page and checks your spelling too. Ideal for writing anything from letters to books as well as programs. Automatic on-screen formatting, underline, bold, italics, superscript, subscript. Left/Right scroll for documents wider than screen. Complete with a 10,000 word dictionary (with utilities to modify the dictionary). Ready configured for DRAGON/DRAGONPLUS or Hazeltine 1500 Terminal and most printers — easily configured for other terminals and printers. Includes the BROWSE file display utility. SP-EDIT for FLEX

LUCIDATA PASCAL COMPILER

A comprehensive implementation of the PASCAL language (ISO Standard) using a P-CODE system. Allows linkage to Assembler code for maximum efficiency. Runs on any FLEX system without modification. LUCIDATA PASCAL for FLEX

DYNACALC

Fast feature spreadsheet similar to VISICALC (tm Visicorp Inc). A must for any business and for many other statistical, scientific and commercial uses.

256 Rows by 256 Columns — Built in HELP Facility
Windows — Graphs — Sort — 16 Digit Arithmetic
Print all or part of spreadsheet — save/load on disk
Pass data to/from other programs — and more

DYNACAL Cfor DRAGON FLEX

DYNACALC for DRAGON FLEX

A complete Database System. A versatile and easy to use system for all sorts of applications involving storage and/or retrieval of records. The size of the database is limited only by the capacity of the disk drive. The database may be easily processed by other FLEX programs. RMS for DRAGON FLEX

SORT/MERGE

A proven and reliable package for manipulating small to very large data files. It allows you to sort records on up to 20 files in ascending or descending order. An essential tool for many business and statistical applications — wherever data must be sorted and analysed. SORT/MERGE for FLEX €69.95

EDIT+

A must for every DRAGON owner. Gets you out of the rut of the 32 by 16 screen and the limited EDIT command. Allows BASIC to work with a 51 by 24 Hi-Res Screen and edit your programs with a full screen editor and comprehensive programmer's toolkit.

EDIT + cartridge EDIT + disk (DRAGON DOS) EDIT+ disk (for FLEX/DBASIC) New Year Special £14.95 New Year Special £14.95 New Year Special £14.95

DASM/DEMON

The ideal combination for learning and using machine code on the DRAGON. DASM is a specially designed assembler for the DRAGON which is easy and convenient to use from BASIC, allowing in line assembly. DEMON is an interactive machine code monitor which lets you look at the internal workings of the DRAGON as well as helping you to debug your machine code programs New Year Special £14.95 DASM/DEMON cartridge New Year Special £14.95 DESM/DEMON disk (DRAGON DOS)

DYNAFAST BASIC COMPILER

Speed up your BASIC programs. Includes DYNAMISER optimiser and DYNAXREF cross reference utilities. £30.45 DYNAFAST cartridge DYNAFAST disk (DRAGON DOS or DRAGON FLEX) £19.95

GET YOUR DRAGON 64 ONLINE WITH CHAT

The EASY way to get on to bulletin boards, ONE to ONE, PRESTEL (300 bps), etc. Requires a DRAGON 64 and a modern and optional printer. Turns the DRAGON 64 into a terminal working at up to 19.200 bps and a serial to parallel converter. Supplied on cassette — can be used with DRAGON DOS, DELTA DOS, CUMANA DOS and DBASIC.

and now CHATPLUS for FLEX

All the features of CHAT plus: works on the standard FLEX Screen (51 by 24 or 80 by 24 with DRAGONPLUS), save data to memory and to disk, send text from disk file, AUTODIAL (with selected modems - includes DEMON modem), online directory, password protection.
CHATPLUS for DRAGON FLEX and DRAGON 64 £14.95

£75.00 Answercall Manual modern (BT Approved) (300) Thorn EMI VX543 Intelligent modem (BT Approved) (300 and £195.00 1200/75 built in autodial/speed match buffer/autoanswer - good value and performance €13.50 Cable for standard modem to DRAGON 64 DEMON modem autodial/autoanswer (300 and 1200/75) £69.00 (not BT Approved) Cable adaptor for DEMON modem to DRAGON 64 CHAT, Answercall Modem and Cable €9.50 £85.00 CHATPLUS for FLEX, DEMON Modem and Cable

ONE-TO-ONE Telex/Electronic Mail

A convenient and easy way to send and receive your own telexes from £5.75 per month Call for more details

COLOSSAL CAVE ADVENTURE

£9.95 NOW AVAILABLE FOR CUMANA DOS A complete version of teh classic adventure game, so complete that it requires a DRAGON 64 with disk system (DRAGON DOS, DELTA DOS, or CUMANA DOS 2.0).

DRAGON HARDWARE

EXPANSION SYSTEM	2140.00
allows 4 cartridges to be plugged into the DRAGON RS232 AND I/O INTERFACE	£63.00
uses the 6551 and 6522 VIA — with comprehensive softwar	re in ROM
MODEM CABLE for RS232 INTERFACE to standard moder	n
(D connector) EPROM PROGRAMMER	£19.95 £78.00
handles most single rail EPROMS including 2764/27129 and	27256
SIDEWAYS ROM	£45.00
holds 4 banks of ROM with up to 58K of programs	(in BASIC or
Machine Code)	onnectors £9.00
111010111111100011110	onnectors £7.00
	£3.00
PLASTIC CASE FOR PROTOTYPING BOARD	13.00

DISK DRIVES

CUMANA DISK DRIVES for the DRAGON 32/64

with Double Density DRAGON COMPATIBLE CUMANA DOS Controller System 1: Single Sided 40 Track (DS250 single)
System 2: Double Sided 40 Track (DS500 single)
System 3: Double Sided 80 Track (DS1000 single) £179.95 £209.95 £224.95 £269.95 System 4: Twin Single Sided 40 Track (DD500 dual) £354.95 System 5: Twin Double Sided 40 Track (DD1000 dual) System 6: Twin Double Sided 80 Track (DD200 dual) £325.95 £105.00 2ND DRIVE UPGRADE KIT FOR DRAGON DISK SYSTEM £99.95 CUMANA DISK CONTROLLER

ACCESSORIES

Best Quality DUST COVER for DRAGON 32/64	£2.99 inc p&p £2.99 inc p&p
NEW DUST COVER for DRAGON DISK DRIVE CENTRONICS PRINTER LEAD Monitor/Sound Lead (composite video — phone input)	£14.99 inc p&p £3.99 inc p&p

FAST MAIL ORDER SERVICE 01-882 0681

EXPORT AND DEALER ENQUIRIES WELCOME PRICES INCLUDE VAT



COMPUSENSE LTD.

PO Box 169, 286D Green Lanes, London N13 5XA Tel: 01-882 0681/6936 Telex: 8813271 GECOMSG





DRAGON USER

Telephone number (All departments) 01-437 4343

Editor JOHN COOK

Production Editor BARBORA HÁJEK

Software Editor GRAHAM TAYLOR

Editorial Secretary LUCINDA LEE

Advertisement Manager SIMON LANGSTON

Administration GERALDINE SMYTH

Managing Editor DAVID KELLY

Publishing Director JENNY IRELAND

Subscriptions
UK £14 for 12 issues
Overseas (surface) £20 for 12 issues

ISSN 0265-0177. Telex: 296275 Dragon User, 12/13 Little Newport Street, London WC2H 7PP.

US address: c/o Business Press International, 205 East 42nd St, New York, NY 10017

ABC

Published by Sunshine Books, Scot Press Ltd. © Sunshine Books 1986
Typesetting by Chesham Press, Chesham, Bucks. Printed by Greenaway Harrison (Southend) Ltd, Southend-on-Sea, Essex Distributed by S.M. Distribution, London SW9. 01-274 8611. Telex: 261643
Registered at the Post Office as a power.

Registered at the Post Office as a newspaper

Dragon and its logo are trademarks of Dragon Data Ltd

How to submit articles

The quality of the material we can publish in Dragon User each month will, to a very great extent depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.

Contents



News

Microdeal's roadshow results — Dragon robotics from Lucidata — Incentive new release — 6809 Show stop press

Letters

The economics of contributing — Dragon Beach head — Dragon Plus query — National Dragon Users Group

Communication

Stuck with a program ... need some information ... we want to know about it!

Dragon Plus

Roy Cotes checks out 'The Ultimate expansion for the Dragon' and comes out with some interesting answers

Special Offer

Two tapes for £2.50? Two books for under a fiver? Melbourne House Dragon goodies discounted this month in *Dragon User*

Advanced Basic

Tighten up your Basic programming technique while you play Bomber from the keyboard of Gareth Fenton

Dragon Joy 17

The mysteries of Joystick operation explained by your own . . . your very own Pam D'Arcy

4 Logical Dragon

Logical operations revealed — and how to use them in your own programs . . . binary will never be the same again

Dragonsoft

24

Some more products given the once over by the Dragon User panel of experts — read on

Adventure Trail

26

30

37

It's that man Mike Gerrard again — and this month more about Scott Adams. Also help with Syzygy and the Clog-Dancing Shepherds of Milton Keynes

Adventure Plus

A cheat program plus maps should help out the baffled in Return of the Ring, thanks to Robin Beard

Dragon Answers

Another batch of puzzled readers enlightened by our resident expert Brian Cadge

Firmware

38

The latest in Brian's series of articles exposing the secrets of the Dragon's ROM Routines

Competition Corner 42

Gordon Lee sets another poser — this time with the New Year firmly in mind . . . and this month, 25 pairs of Melbourne House tapes are up for grabs

Editorial

The New Year has always been a time for looking back on the past 12 months and attempting to sum things up — so now seems a reasonable time to sit down and think about where you and your Dragon are going.

13

Why did you buy your computer in the first place? As an educational tool? To play games? To mess around with code? Or maybe you just wanted to find out a bit about the new technology? Whatever the reason, well over a year after the Dragon was written off in many circles (and since then lesser computers have arrived on the scene and then vanished just as quickly — take the C16 for example), your choice of computer remains a valid one.

Education — you've only got to take a look at what the Spanish are doing to see the potential. Games — the market may not be so prolific, but the quality is there. Technical — powerful expansions and utilities abound. Curious — the Dragon's excellent Basic and the wide range of add-ons currently available should keep you occupied. So what's keeping you from using your computer? At the 6809 show, one exhibitor told me he was optimistic but, "there are a lot of Dragons out there, stuck in the loft." He could be right . . . but what on earth are they doing there!

It is a fact that in many ways there has been no better time to own a Dragon. So if you're reading this in the newsagents and haven't touched a computer for months, take a closer look inside our pages, get the computer down from the attic and treat yourself to a session on the keyboard this evening. And make 1986 the Year of your Dragon.

The Dragon's Arm!

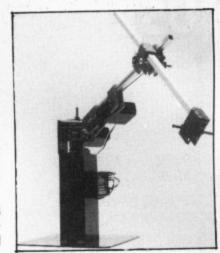
Lucidate have been keeping themselves busy. After launching their Dragon's Claw digital interface and Snap-Dragon vision system, the Cambridge based company are now offering a range of low-cost peripherals for experimental Robotics. These are based on the highly successful Beasty Arm from Micro Robotics which has been available for the BBC micro and Spectrum for some time. All the control software necessary to drive the eight-channel servo controller Beasty through the Dragon's Claw is provided on cassette. The servo controller plugs into the Claw and can be used at the same time as the Snap camera, thus creating the possibility of providing vision guided control of the arm. The controller can handle up to eight standard model servos.

The actual Robot Arm is supplied in kit form and comprises a solid metal base and a collection of tubular aluminium rods and special plastic joint units. It is powered by standard radio control type model servos.

Lucidata is offering two Robotics packages, a starter pack with Beasty controller and two servos at £70 plus VAT and a complete three-axis Robot Arm kit including Beasty controller and three servos at £100 plus VAT. Both are available by Mail Order only from Lucidata Ltd, PO Box 128, Cambridge CB1 1DQ. Tel: 0223-356846. Visa and Access cards accepted.

At the same time, Lucidata are announcing a new implementation of their established Pascal System, version 3.9/P, running under Flex for the Dragon/Tandy.

Lucidata describe the key design objective of their Pascal as user friendliness, with extensive error checking at the compiling stage and the runtime stage, with all errors being



The Beasty Arm

reported in English. They also claim it conforms 'very well' to the ISO standard.

It is planned to be marketed through Compusense, costing £75 plus VAT.

Road Sho

Microdeal's recent ambitious Dragon Roadshow, covering Newcastle, Manchester, Leeds, Birmingham and Cardiff all within eight days seems to have gone down well with the general public and established users alike.

"The Roadshow was a great success", says Microdeal Marketing Manager Alan Hobbs, with a good level of support at almost every venue. A sparse turn-out at the Wellesly Hotel, Leeds was attributed to lack of pre-publicity.

Many new Dragons were sold - with the 32 selling for £50 (including £30 worth of software) and the 64 selling for £79.95 (including £50 of software), and Microdeal's new titles such as Trekboer and Shocktrooper proved to be popular.

Plans are already afoot for a follow-up Roadshow in the Spring. Microdeal can be contacted at 41 Truro Road, St Austell, Cornwall PL25 5JE.

Incentive convert Moon Cresta

Those old warhorses Incentive Software are set to bring out a version of that arcade classic Moon Cresta for the Dragon. This vintage shoot-'em-up, brought out by Nichibutsu in 1980 was a legend in its own time in arcade circles.

Successfully released on Spectrum and Commodore some months back, the Dragon version is being written by John Martin (author of the Ket Trilogy), and Incentive Director Ian Andrew expects it to become available towards the end of February. Available by mail order only from Incentive priced £7.95 - 54 London Street, Reading RG1 4SQ. Tel: (0734) 591678.

Stop

The Third 6809 show attracted an estimated 7.000 users . . . full show report in next issue.

Week-end away

The shortbreak holiday for Dragon enthusiasts which took place in mid Wales over the last weekend of October proved to be an unqualified success for all participants, some of whom were not even Dragon owners! They had travelled from various parts of England and even Scotland to Llanfyllin in Powys for this first off Dragon-

First off it was, and judging by the response a second similar gathering will be taking place in the early Spring of 1986. Right from the start participants enjoyed their common interest - 6809 computing, ideas and methods were exchanged over dinner and late into the early hours of the

After very little sleep the group reassembled to hear Mr Ted Opyrchal, managing director of Compusense, give an informal talk on the current situation of Dragon and

Until the next time.

After a brief pause Mr Rod Lloyd, Technical Director of Race Electronics' took over and explained their company's link with Dragon which dates back to the days when they built not only the Dragon but also the

The afternoon lived up to expectations with plenty to keep our interest including a brief talk given by Mr Stan Opyrchal, Ted's brother and Technical Director of Compusense. He outlined the use of Comms software, modems, bulletin boards and electronic mail/telex facilities.

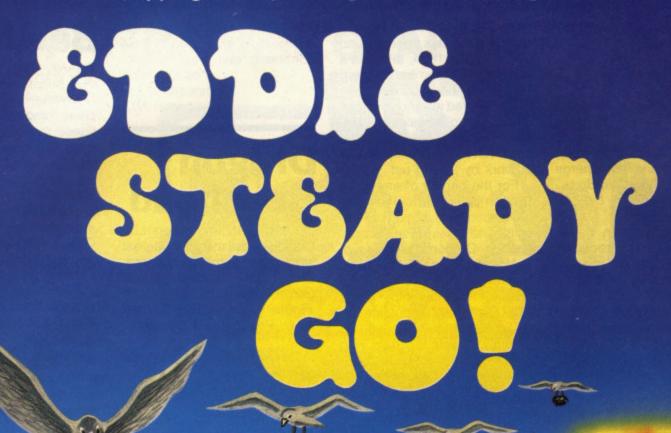
An eventful evening was spent 6809-ing an early night was had by all - 1.30 am! Then next day a planned visit was cancelled - once again the groups gathered around the eight Dragons to savour every last minute of the weekend.



Rod Lloyd

There will be a next time, and we would happily welcome Tandy and other 6809 devotees — and friends. For further details Marketing/ Morgan, contact Bob Information Officer, Mid-Wales Tourism Owain Glyndwr, Council, Canolfan Machynlleth, Powys.

HERE IT IS! The 22 screen, 60 level, See Sawing, Frog Slurping, Lift Catching, Apple Munching, Mind Blowing, Eddie Guiding, Arrow Dodging, Mountain Jumping, Laser Zapping, Airship Gazing, Boulder Hopping





Name/Address

INCENTIVE SOFTWARE LTD - 54 LONDON STREET, READING, RG1 4SQ Credit card telephone orders - Ring (0734) 591678

FROM INCENT

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Money Matters

WITH REFERENCE to Craig Henderson's letter (*Dragon User*, November), I disagree with his opinion that Peter Whittaker should not charge £3 for a cassette of Wordproc, also published in *Dragon User*.

Has Mr Henderson considered the cost of producing cassette programs for readers of a magazine as popular as *Dragon User?*

As Mr Henderson informs us, cassettes do indeed cost 50p. But padded envelopes cost another 50p each, and a 24p stamp is also necessary. That brings the total cost for each order received to at least £1.24.

Additionally, there is the inconvenience for the author, who must buy the materials, save the program several times to ensure a good quality copy, not to mention the time and effort involved in writing the program and article in the first place. For a program as comprehensive as Wordproc, this must have taken quite a while!

If Mr Henderson prefers to type in programs from listings rather than pay £3 for the privilege of having a cassette sent to him, the choice is entirely his.

Objections would be justified if the price being asked was considerably higher, but I for one feel £3 is a small price to pay for typing in 3,000 bytes of hexidecimal numbers.

This is especially true when one considers that similar word processor programs cost rather more than £3, or even £10.

Stephen Williams Porthcawl South Wales

NDUG

WITH REFERENCE to the letter from Martin Vernon (Letters Page October 1985). I can't help wondering if Martin has ever bothered to take sufficient time off from all that programming, etc, to attend one of the 6809 Shows or even to read Dragon Userl . . . If he has, it seems strange that he doesn't

know that the National Dragon Users Group has been around since August 1984, and has a very healthy membership list!

Most of his queries have been covered in various issues of the group newsletter "Update", and it's possible that he could have saved himself a lot of work by joining us!

For the benefit of any other Dragon users who may not have noticed us, all you have to do is send a sae to Paul Grade, National Dragon Users Group, 6 Navarino Road, Worthing, Sussex, and we'll send you full details. Membership costs £7.50 per year (£9 outside the UK), and this gets you a monthly newsletter, help with hardware and software problems, advice and help with repairs, and quite a few special offers from various companies.

Paul Grade Chairman Worthing Sussex

Dragon Plus

I HAVE received many letters on enhancements for the Dragon, most of the letters concerned the poor text display on the Dragon, which seems to be the major problem with Dragons both in domestic and other uses. Other people were concerned about the Dragon 32 and its future role.

Our new Dragon plus interface was designed for both 32K and 64K owners and gives the better display quality we all felt was needed. It also allows 32K owners to join the "FLEX set" if they want to, or to add much needed memory to their computers. In addition our new expansion can save the cost of an additional disk unit for disk owners as the extra memory is configured as a very fast RAM Disk when FLEX is used. We are also working on OS9 drives for release soon.

Our approach is to use existing, cheap, technology to give as many owners as possible the opportunity of expanding their computers at a reasonable cost, hence Dragon Plus. Compusense does not own Dragon — some people tend to forget that!

May I thank all the readers who wrote to me. I have not

had time to reply to each person but I have read all their comments with great interest.

Ted Opyrchal Compusense Ltd London N13

Dragon Beachead

TO DRAGON Computers Ltd. Could you tell me your nearest stockists of games in my area. Plus I have noticed several games like Combat Lynx, Fighter Ace, Beach Head, Forth Protocol and Ghostbusters

Do you make any of these games.

Colin Jackson Carlisle Cumbria

ACTUALLY, Colin, Dragon User has no connection with the people who make the Dragon Micro, nor with any companies which make games for it — we are an independent magazine.

Pokes

REF: Reply to Harry C. Taylor (October 1985 *Dragon User*), the following line can be added to Steve Gathercole's Moon Miner (June 1985 *Dragon User*).

165 POKE 30016,18: POKE 30039,19: POKE 30044,25: POKE 30067,24: POKE 30072,30: POKE 30095,30.

This will enable the program to be run with the Dragon DOS plugged in.

Dragon DOS users might be interested to note that this letter was typed using Peter Whittakers word processor (September 1985 Dragon User). It is certainly different to any other word processor that I have used and once you've got used to it, it definitely works.

How about listing a few Bulletin Board numbers?

Here are a few 24 hour 300 baud numbers (FREE). RBBS 0376 518818 GOSPORT 0705 524805 BELTON 0493 781334 TUG 01 200 7577 ESTEC 010 31 1719 84240 (HOLLAND).

Graham Smith 3 Ashton Gate Terrace Bristol BS3 1TA

Baudwalk

THANK YOU for mentioning my bulletin board in your November issue. There are some things that weren't mentioned that would be useful!

a. The board runs at 300 baud using CCITT tones.

 b. Settings needed to access are 7 data bits, even parity and one stop bit.

c. You don't need to have OS9 to access the board any communications software capable of the above will work.

Finally, another plug for the system: times are Wednesday and Saturday 1900 to 2200 and Sunday 1000 to 2200. The number is 0705 736025.

Jon Dunster (Sysop BBS09)

Pros & Cons

RE-DRAGON Plus Expansion by Compusense. I am interested in the above expansion for my Dragon 32 and have received some information from Compusense, but before I commit myself to purchase of same. I wondered if you have had a look at it and if you had could you advise me of the pros and cons, as you may appreciate I do not like wasting money.

Mr D. Barber 64 Eden Close Woodthorpe York

Read further on for details Mr Barber.

Epsom

THE ARTICLE "Coding The Words" by Peter Whittaker was in my opinion the best ever run in your magazine. However, for those of us with Epsom or Epsom compatible printers, the program needs some alteration:

POKE &H11E2,17 POKE &H11CB,17

This changes the "SO" command which my printer interprets as condensed mode to a more manageable "DC1" command.

Mike Hodges 3 Lilstock Avenue Ashley Down Bristol BS7 9LE

WINTERSOFT PRESENT THEIR FIRST ADVENTURE WITH PANORAMIC GRAPHICS

THE BARONS OF CETI V are the eight fabulously wealthy owners of the distant planet Ceti V. Between them they control the Galaxy's richest source of cetite ore, the fuel for hyperspaceships.

THE JUXTAPOSITION is the meeting point of two totally different universes, a semi-mythical line of dimensional instability thought to pass through Ceti V.

AS SERVITOR CROSS, Baron White's head troubleshooter, you face a daunting mission. Far to Ceti's north, beyond the blue mountains, the unscrupulous Baroness Black is meddling with the JUXTAPOSITION's awesome power. Alone, you must travel the airless wastes of Ceti V, to discover the purpose of her secret experiments.

JUXTAPOSITION is the first in an epic new series of adventures from WINTER-SOFT, creators of the widely acclaimed RING OF DARKNESS. Written 100% in machine code it features over 600 internal locations, a 4000 location planet, complete sentence input, and, with our spectacular PANORAMIC GRAPHICS system, nearly 32000 colour 3D views of the planet's surface.

Available on cassette for Dragon 32/64 price £6.95

May luck travel your path.

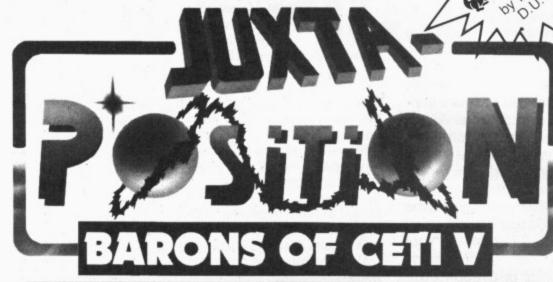
HOW TO ORDER

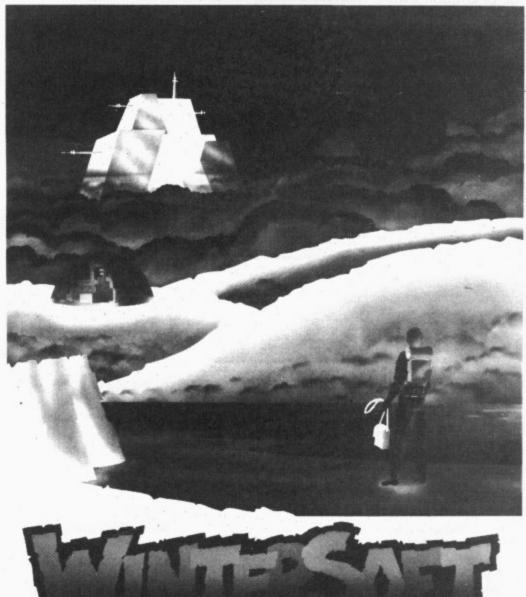
Don't despair if you are unable to buy our games locally. Our express mail order service will despatch your order within 24 hours of receipt. Fill in the order form on this page (or write us a letter), enclose a cheque or postal order made payable to WINTERSOFT, and post it to:

30 UPLANDS PARK ROAD

EN2 7PT 01-367 5720 (Trade enquiries welcome)

ENFIELD, MIDDLESEX,





ALSO AVAILABLE:-DRAGON 32/64 Return Of The Ring

Return Of The Ring The Ring Of Darkness Dragon Trek

AMSTRAD CPC 464 The Ring Of Darkness

SPECTRUM 48K

The Ring Of Darkness

ORIC-1 48K

The Ring Of Darkness Operation Gremlin

All titles at the new WINTER price of £6.95 each.

PRICES INCLUDE P&P, VAT, AND OUR LIFETIME GUARANTEE

ORDER FORM

Please rush me:
QUANTITY TITLE COMPUTER

I enclose my cheque/P.O. for £

Name

Address

Communication

Send in you questions, requests, and pleas to Communication, Dragon User, 12-13 Little Newport Street, London WC2

Communication, as defined by the Extremely Small Pocket Oxford Dictionary, is the 'imparting or exchange of information' . . . and this is what 'Communication' in Dragon User will be all about too. As commercial technical and software support for our computer wains, we get ever increasing amounts of mail on a variety of subjects, all asking for help and information more than our Supremo Brian Cadge could ever handle. So this is your chance to reach many thousands of Dragon owners who might be able to help you - and, of course, if you can help someone why not drop them a line? Here are the first few problems to kick off — we'll be hoping to pack more in next month. Over to you . . .

Dump

COULD ANY reader supply me with a Basic program to Screen Dump from a Dragon 64 to a Tandy TRS-80 Colour Graphic Printer

Any costs incurred would be reimbursed.

J W Middlemiss 10 Cleveland Gardens High Heaton Newcastle upon Tyne NET 7QA

Repairs

I HAVE been a Dragon User for two years (Dragon 32). I have now encountered a problem. After perfect service it has now developed a fault. I returned it to Dixons from where it was purchased — it was then returned to me unrepaired, stating that there was no place that now repairs or stocks Dragons.

you could advise me of a repair shop or such in the North-West or in fact anywhere.

M P Finn 7 Windsor Drive Ellesmere Port South Wirral L65 6SH

Midi

WANTING TO broaden my Dragon's Horizon in the realms of music creation, I wonder if you could advise me as to whether there is a company that produces a Dragon Midi interface?

Peter Thompson 132 Southview Drive Westcliff-on-Sea Essex SS0 9QD

Synth

I AM writing for information on any software or hardware which will produce Drum and Sythesizer sounds for the Dragon 32. I have seen software for the Commodore and Spectrum — also a new hardware machine which produces Drum sounds. I would like to know if anyone has anything like this for the Dragon 32. Can you help?

Christopher Leafe
3 Minster Walk
Hurworth
Darlington
Co Durham D62 2AR

0-	-	-		-		0
Co			ui	ш		OH
				_	Annual Contraction of the	albandlerder

I write to you in the hope that

Stuck for a routine? Need some obscure equipment? Feeling cut off? Fear not — someone, somewhere can help you! Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send it to Communication, Dragon User, 12/13 Little Newport Street, London WC2H 7PP. We'll publish it as soon as we can — meanwhile, maybe there's someone you can help this month!

Problem		
Problem	•••••	
***************************************	•••••	
Nama		
Name		
Address		

GOSUB DRAGONAS

Don't lose out — make sure you receive the next twelve issues of your favourite microcomputer magazine by sending away for a year (or two years) subscription today.

Just complete this special subscription order form now, and send it with your cheque or postal order to our subscription department.

And if you subscribe for **two years**, you can claim a **free book**. Choose from any one of these superb Sunchine microcomputer books — *The Working Dragon 32, Dragon 32 Games Master, The Dragon Trainer, Advanced Sound and Graphics for the Dragon computer*, or *Artificial Intelligence on the Dragon computer*.

	FREE BOOK CLAIM FOR 2 YEAR SUBSCRIPTIONS
Subscription type:	☐ I claim my free book (title)
 □ 1 year at £14 UK □ 2 years at £28 UK plus free book □ 1 year at US\$49.95 US/Canada airspeed □ 2 years at US\$98.90 US/Canada airspeed plus free book □ 1 year at £20 Rest of World surface □ 2 years at £40 Rest of World surface plus free book 	Name
Other overseas airmail rates available on request	Send this complete form, with your payment, to:
Payment Method I enclose a cheque payable to Dragon User I enclose a postal order payable to Dragon User	Dragon User Subscription Department, Oakfield House, Perrymount House Road, Haywards Heath, Sussex RH16 3DH

Dragon Plus

The ultimate expansion for the Dragon? Roy Cotes checks it out.

COMPUSENSE PROUDLY advertise their 'Dragon Plus' board as being the 'Ultimate Expansion For Your Dragon'. This is a very bold statement indeed and so it was with great interest that I prised it from it's wrappings. (Compusense are very, very generous with their sticky tape!).

The expansion unit costs of a single, very professional looking circuit board about six inches square with a short ribbon cable connected to it. The board has been designed to 'piggy-back' onto the Dragon's main circuit board, which is nice because the whole thing fits inside the Dragon's case and so leaves the cartridge connector completely free. Instructions for installing the board may appear a little sparse at first consisting of only a single sheet of paper. but all the necessary information is present and includes diagrams and photographs of the fitted device. Provided that a little care is exercised, the job is quite simple and should create no problems even for the most inexperienced user.

The principal components on the board include 64k of dynamic RAM, a 6845 Video Display Generator (VDG) as used in the BBC micro, an 8k Eprom containing the character set for the VDG, a 2k RAM chip which is used to store the information displayed by the VDG, and after installation, your SAM chip and one of the Dragon's BASIC EPROMS.

There are three steps to installing the board, the first is to bypass a resistor on the Dragon's main PCB, the second is to fit the board itself, and the final step is wiring up the extra monitor socket. Obviously the first thing to do is remove the Dragon's top cover and keyboard assembly to gain access to the main PCB. Once everything is out of the way then the work can begin.

The bypassing of the resistor involves simply soldering a short jumper wire across the legs of the component. This resistor forms part of one of the oscillator circuits within the Dragon and unless the jumper wire is fitted, a screen flicker may become apparent when using the 80 column display.

Installation

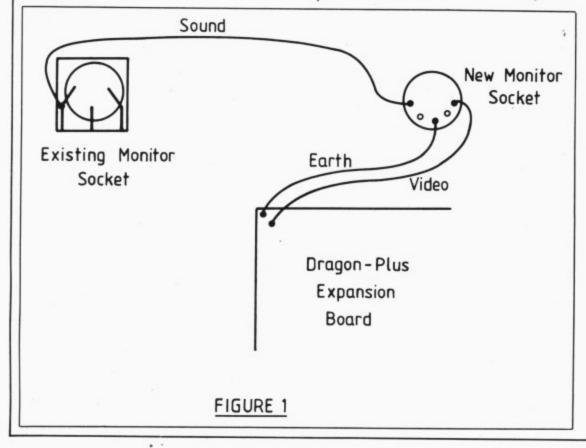
The fitting of the board itself is very easy. Firstly the SAM chip must be very carefully removed from its socket and inserted into a new socket provided on the expansion board; this is the part where the care must be exercised as the SAM chip is VERY sensitive to handling and VERY expensive to replace. The first of the two BASIC Eproms must also be removed from the main PCB and inserted into a socket on the expansion board which now neatly slots

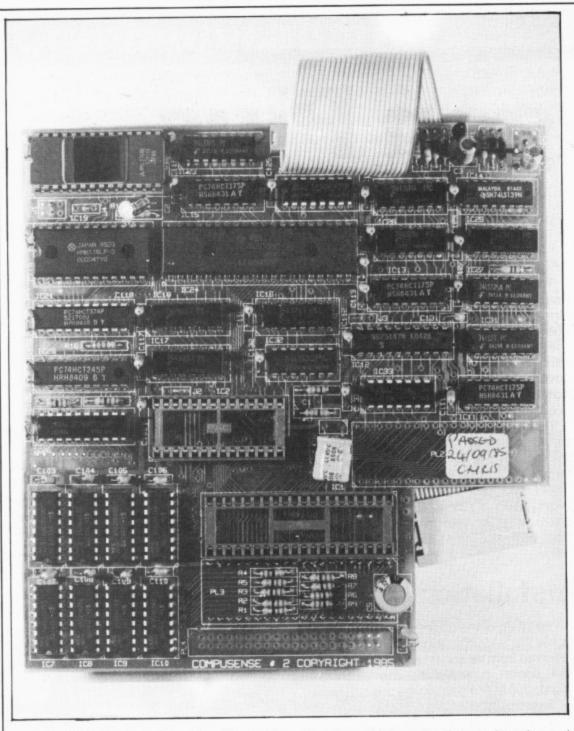
into the empty socket on the main PCB which was originally occupied by the SAM chip. Now the Ribbon cable connects to the socket on the main PCB in place of the BASIC Eprom which was removed earlier. It is recommended that a little adhesive is used to secure the board in place and care must be taken to ensure that the underside of the board does not come into contact with any of the components on the main PCB. This is not a problem as it is only a case of bending the odd capacitor so that it lies flat on the board.

Finally the extra monitor socket. A monitor is essential on any machine that uses an eighty column display as an ordinary television set will not display that amount of information clearly enough to be of much use. The obvious choice is to fit a DIN socket to match the monitor socket fitted as standard on the dragon; this will enable existing cables to be used. Wiring the socket up is very easy provided you have access to a soldering iron. Two wires must be taken from the top left hand corner of the expansion board (which is clearly marked) - these are the composite video signal and an earth wire. A third wire is taken from the back of the existing monitor socket to provide the sound output (Fig One).

Features

So, installing the board is quite easy, but what does it offer? There is the 64K of RAM on the board which may be accessed as two banks of 32K by means of the RAM paging capabilities of the SAM chip. There is a 6845 Video Display General (VDG) which is the same as used in the BBC micro and which will give an 80 column by 24 line display. There is a 2K RAM chip on board which is used by the VDG so that none of the Dragon's RAM is used for display purposes, but the real power of the expansion board is demonstrated when the custom version of Compusense FLEX is booted. FLEX on a standard Dragon is very powerful but in conjunction with this board several new features become apparent. The new FLEX uses the extra 64K of RAM as a silicon, or 'virtual' disk, equivalent in size to 240 floppy disk sectors. This as you can imagine is very quick when compared to an ordinary floppy disk unit as access to data will be very much faster. The only problem is that with the virtual disk being volatile RAB, as soon as the Dragon is





switched 'off' all data held on the virtual disk will be lost. This problem has, to a certain extent, been alleviated by Compusenses recommended use of the virtual disk. The example start up file given on the system disk defines the virtual disk as being the main system disk and then copies the most often used files such as the CAT and LIST utilities from floppy disk to the virtual disk. This means that these commands are executed almost immediately as there is no disk access required to load the command into the utility command space before that command may be executed. An example is the TSC editor which takes 8 seconds to load from floppy disk but only 2 seconds to load from the virtual disk. Although this is only a saving of 6 seconds, a program which requires a lot of disk access (such as the assembler program) took one minute two seconds to assemble a short file using the original floppy based system but only 14 seconds using the virtual disk system. This is a saving of 48 seconds. On a larger file the savings will obviously be even greater.

The FLEX system disk supplied is booted under Dragon DOS using the familiar BOOT command. A minor hiccup here is that because the monitor needs to be connected to the new 80 column monitor socket, the BOOT command has to be

either typed 'blindly' or the monitor plugged into the standard Dragon monitor socket.

The new version of FLEX allows you to ask a logical number to each device on the system. For example the virtual disk may assigned as device zero and the floppy disks on a multi-drive system may be' assigned the numbers one and two. Once the devices have been assigned a number, they may then be assigned a function such as whether they are system or working devices. By assigning the system to be 'all' drives then the virtual disk will be searched first followed by the first of the floppy disk units. This means that the most often called files which have been moved to the virtual disk will be called very quickly whilst the lesser used files will also be loaded from floppy without the user having to specify a drive number.

The virtual disk may be treated in just the same way as an ordinary disk unit using the same standard commands such as CAT and LIST, but an extra command called VINIT has been added to the system disk which will effectively 'format' the virtual disk in the same way as an ordinary disk would be.

The FLEX system disk comes with a customised version of DBASIC which has been updated to work with the 80 column

display so that BASIC users will benefit from the Dragon-Plus as well as the dedicated Flex-Fanatic. Most of the commercial software available for FLEX (and OS9) was originally written to be used with an eighty column display so there is no shortage of software available. Some of the packages currently available for the 51 column display, including SP-EDIT and the RMS database system, were tried with the Dragon-plus system and found to work perfectly.

Conclusion

In conclusion, the board is manufactured to a very high standard using high quality components. There were no problems encountered fitting the board to the Dragon. The custom FLEX system worked admirably, and the whole package worked first go. The 80 column display is very, very fast and exceptionally clear. The control codes which set up the various screen features on the 51 columns hi-res display such as windowing, etc, have all been adjusted to work with this new display. The Virtual disk certainly gives the impression that you are using a 'real' system and offers a lot more flexibility than would normally be available. For the single floppy drive owner wishing to move to a twin drive system it may be worth considering a Dragon-Plus instead of buying a second floppy drive. As well as getting the much needed 80 column display, the expansion is cheaper, faster, and quieter than a floppy drive and when the time comes to expand to an even bigger system the Dragon-Plus board already has the connector ready to interface to Compusenses hard disk controller which should be available in time for the November 6809 show

Compusense are currently perfecting a ROM based version of FLEX which will replace one of the BASIC eproms so that the Dragon will 'power-up' as a Flex system which will support printer spooling (the ability to list files to a printer whilst running other software) and should BASIC be required then DBASIC will still function as normal. Unlike many expansions or other add-ons, you do not lose any software compatability with the Dragon-Plus system. It is still possible to use the Dragon as if no expansion board was fitted.

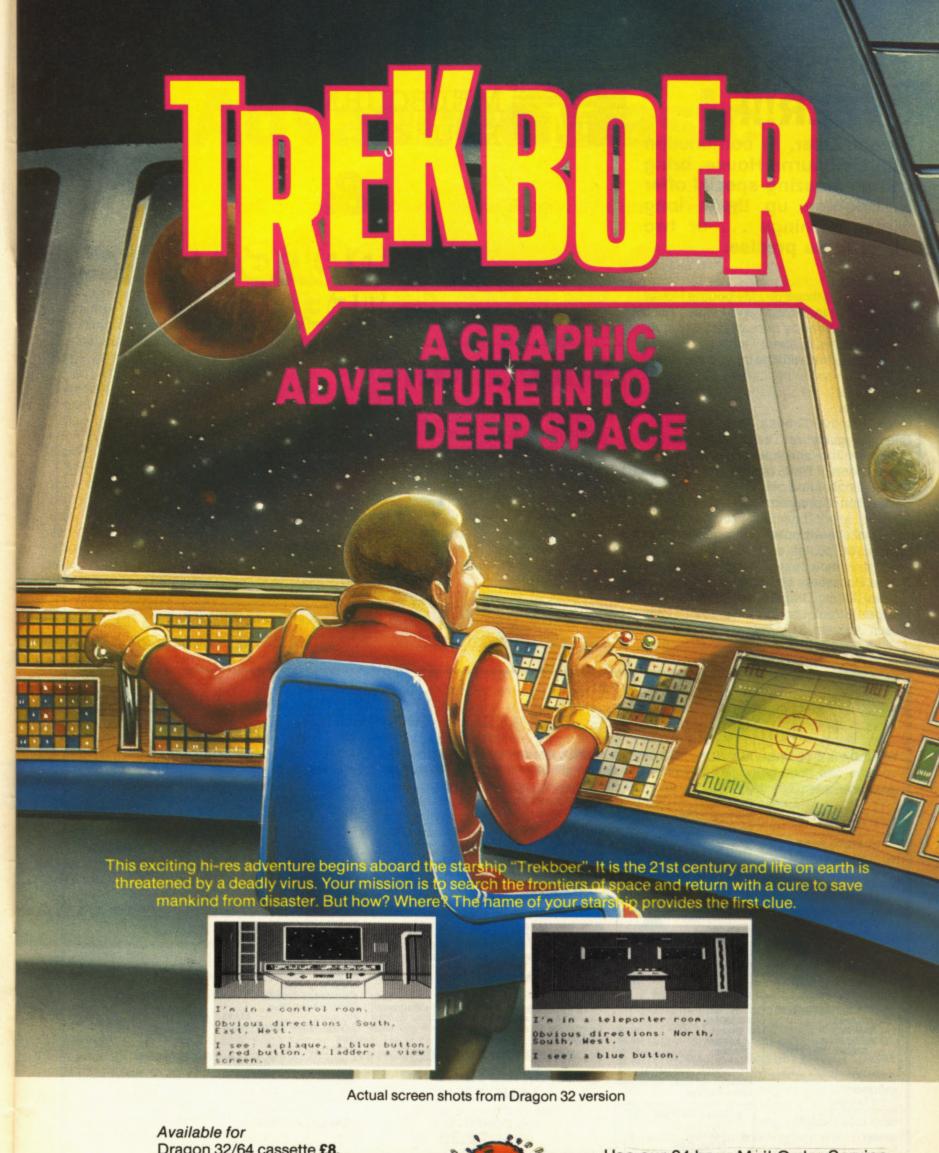
As for the claim that this is the ultimate expansion for the Dragon, well, at the present time there is nothing that compares with it. Add to this Compusenses future plans and their claim may be a genuine one.

Hardware — Dragon Plus
Expansion

Price — £103.50 (plus £1.00 p&p)

Micro — Dragon 32 & 64

Supplier — Compusense Ltd
PO Box 169
286D Green Lanes
London N13 5XA
Tel: 01-882 0681/6936



Dragon 32/64 cassette £8. Tandy colour 32K cassette £8. IBM PC & most compatibles £19.95

Requires 128K & colour graphics.

Post & Packing 75p



Use our 24 hour Mail Order Service

0726 68020 📉 🚾 📴



By post to AMICIROIDOST

41 Truro Rd St Austell, Cornwall PL25 5JE

SPECIAL OFFER!!!

Dragon User, in conjunction with Melbourne House, bring you an amazing special offer to brighten up those long winter evenings ... or two offers to be precise.

Tape Offer

We're offering those two Melbourne House classics Hungry Horace and Horace goes Skiing at a giveaway price of £2.50 (including P&P) for both titles! That's £1.25 each . compare that with the total retail price of £11.90!

Book Offer

Buy either the 'Dragon 32 programmer's reference guide' or 'Dragon machine language for the absolute beginner' at our special price of £4.95 (a saving of £2.00 on the retail price) and get 'Enter the Dragon', a collection of programs for the Dragon 32, free!

Fill in the form opposite — together with a cheque or postal order for the correct amount, made payable to 'Melbourne House Publishers Ltd' and send it to us at Special Offer, Dragon User, 12-13 Little Newport Street, London WC2H 7PP. Offer closes January 31.





DRAGONIS

Special Offer

Please send me (indicate choice): ☐ Hungry Horace & Horace goes Skiing package..... £2.50 Dragon Machine language (plus Enter the Dragon) £4.95 Dragon 32 programmer's guide (plus Enter the Dragon) £4.95 Total (Orders outside UK please add £1.00 for postage) Name

(Make cheques/POs payable to 'Melbourne House Publishers Ltd' — send coupon to Special Offer, Dragon User, 12-13 Little Newport Street, London WC2H 7PP.)



27 COOMBE ROAD SOUTHMINSTER, ESSEX CM0 7AH



WOULD LIKE TO WISH ALL OUR CUSTOMERS A VERY MERRY XMAS AND NEW YEAR. MANY THANKS FOR YOUR CONSIDERATION. We hope you will be pleased with some of the extra "specials" we have for you this month.

SOFTWARE PROJECTS Manic Miner Jet Set Willy

RSP £7.95 Our Price £6.50

MELBOURNE HOUSE Hungry Horace Horace Goes Ski-ing £2.99 each or £5.00 pair

Football Manager RSP £7.95 Our Price £6.50

DESIGN DESIGN Tubeway Army Rommels Revenge Dark Star RSP £7.95 Our Price £6.50

HEWSON CONSULTANTS 3D Luna Attack 3D Space Wars 3D Seiddad Atta SPECIAL XMAS PRICE Only £2.99

WINTERSOFT Ring of Darkness Return of the Ring RSP £9.95 Our Price £7.95

IMPSOFT Fruity Chicken Run Our Price £3.50 each FOR A FAST MAIL ORDER SERVICE send your order to the above address making all cheques/Postal Orders payable to COMPUTAPE. For Catalogue

only, please send SAE

A & F SOFTWARE Chuckie Egg Screaming Abdabs PEAKSOFT Tim Loves Cricket

New Champions Photo Finish \$6.95 Don't Panic OCEAN

HUNCHBACK CHRISTMAS Only £1.99

INCENTIVE

The Ket Trilogy Back Track **Eddy Steady 26.95 MICRODEAL £0.99 El Diablero host Attack €0.99 Worlds of Flight 00.02 (Please check availability of other Microdeal and Pocket Money titles before ordering)

CABLE SOFTWARE Zak's-son Superbow Fantasy Flight Quazimodo All at only £2.99 each

OR TELEPHONE 0621 772589 FOR 24HR CREDIT CARD SALES.

Prices include FIRST CLASS POSTAGE and packing.

HERE'S YOUR CHANCE TO PURCHASE SOME OF THE BEST SELLING TITLES FROM 1983, AT BUDGET PRICES. NINJA WARRIOR (PROGRAM FACTORY) £2.99
Guide your Ninja through boulders, fire, pitfalls, flaming meteors and Ninja Masters to become the NINJA GRAND-MASTER. Up to 6 players, keyboard or joystick, with 16

(PROGRAM FACTORY) TASKSHIP This is an excellent skramble type game, very original. You can even redesign your own caverns if you think it's too

(PROGRAM FACTORY) Guide your MK XIX Drone Cruiser through space but beware of the mines and the mothership. Up to 4 players, new maze every 10,000 points.

(B & H SOFTWARE) AND ALL BECAUSE You must dive, run, horse ride, motorcycle, jump, hand glide, ski, dangle from a ski-lift and parachute to your beloveds before she gets there. Will you make it in one

(B & H SOFTWARE) Here you stagger around town to get home without getting either run over or arrested. The more you drink, the faster the traffic gets and the more police come out. A quick burger

IMPORTANT NOTICE!!!

MADNESS and the MINOTAUR now available exclusively from COMPUTAPE for only £2.99

(Produced under licence from Spectral Associates, Washington, USA)

ADVENTURE INTERNATIONAL

Adventureland/Secret Mission Waxworks/Feasibility experiment Wizard of Akyvz/Persuas Andromea Pyramid of Doom/Mystery

Ghost Town/Golden Voyage £7.95 per twin pack CROUCHER COMPUTER

SOFTWARE C.A.D. 34 A computer aided design program to help you design your own screens. The program is based on the cursor, under control of the joystick, so there is no need for a menu. Therefore the whole screen

is constantly displayed. Includes a total of 17 functions. SMITHSON COMPUTING Electronic Author Word €14.95 DRAGON/TANDY COLOR CRUN-

CHER ELKAN ELECTRONICS A machine code program which converts Basic Dragn programs to Trandy and Tandy programs to Dragon. (Will ignore machine code and the contents of REM and Strings).

Our Price £7.95

LEARN BASIC PROGRAMMING. LOGIC 3 £0.00
Pack containing manual and 2 cassette tapes with 19 programs to help you learn Basic.

* JOYSTICKS *
Quickshot 2 (Spect)
Peaksoft (Multi-Directional)
£9.95 Pair. £5.50 each

 ★ CASSETTE RECORDER ★
Phillips D6260. Tape Counter.
Mains/Battery, 12 Months Guaran-€24 95

★ MONITOR ★
Philips 7522, 12in Amber Screen,
12 Months Guarantee, £90.00

* PRINTER*
Mannesmann Tally 80+. quality printing, easy paper load-ing, many features. 12 Months Guarantee. Literature available on £245.00 (NB. Printer Cable not included)

* CASSETTE LEAD €2.50 * CENTRONICS PRINTER

£11.95 * DUST COVERS £3.95

*S/S, D/D, 48K DISKS Our Price £19.95 * S/S, D/D, 96K DISKS (Pack of 10) Our Pri Our Price £29.95

NOTE: Please allow two weeks for delivery of Cassette Recorder and Monitor. Printer delivered one week following order Prices include delivery charges.

OVERSEAS ORDERS WELCOME.

COMPUTAPE: The only Software Company to make your Dragon chips fry not

PLEASE REMEMBER XMAS LAST POSTING DATES: UK - 19th Decem-

12 Dragon User January 1986

Advanced Basic

Work and play combined on the Dragon by Gareth Fenton

THE DRAGON has a very powerful Basic but poor documentation, and there are a number of useful routines and commands not covered anywhere. This article demonstrates, with an example game program, some lesser known techniques available to all, whether or not they possess an assembler. The only machine code in this program are ROM routines that can be called from Basic with "EXEC", and the short auto-run routine that works with any Basic program.

The object of the game is to keep your three cities as cities (instead of rubble) for as long as you can. Trying very hard to stop you are the alien bombs that fall vertically from the top to the bottom of the screen, always ending up on a city — unless you destroy them en route.

This is achieved by moving your ship up and down on the left of the screen to be in line with the bomb and pressing the fire button. Easy! By the way, just to ensure that you don't delay, the alien attack ship is constantly manoeuvring for a clear shot at you. If you remain stationary for too long, it will fire. Like the bombs, it never misses. The time delay before it fires, and the time taken for the bombs to fall, decreases at each level. Only certain parts of the bomb (the white parts) mean a hit, so good shooting is needed.

Pause and Return features are written into the game. Simply press either P or R at any time. To restart after Pausing, press any key. Level 6 on the game is a "suicide level" — to see what I mean, select it and try. You will not last long.

The auto-run routine starts at line 3000. Instructions for it are included in that part of the listing. I suggest that you type in GOTO 3000 as a direct command before running to save the program so that it will auto-run. NOTE. Type CLOADM to load the program once saved in this way.

I will now explain how the program works.

Welcome to the world of structured programming! This means that each section of the program has been made into a mini-program or subroutine, each one being called with GOSUB and terminating with a RETURN command. The GOSUBs and the start of each subroutine are labelled with REM statements so that you can easily follow what is going on. Writing your own programs like this is not very hard once you get used to it, and they are much easier to debug than "spaghetti" programs, ie with GOTOs everywhere! They can also be quicker to run. There are a lot of REMs (') in the program — these

can be left out if you wish.

Lines 10-180. This is the main control routine — it calls each subroutine. Many of you will be puzzled by lines 120-140 and 170. The variables YOUHIT, THEMHIT and FINISHED are set to -1 inside a subroutine and the DRAGON reads these lines as

IF YOUHIT = -1 THEN . . .

This is because -1 is the code for "true". This is hard to explain so try it yourself with the following:

LET A=5:PRINT A=5

-1 is the answer.

PRINT A=3 returns 0 indicating FALSE.

I have used this method to pass TRUE and FALSE messages between routines as it is easier to follow, looks better and is slightly faster. IF NOT FINISHED in line 170 explains itself.

The same sort of thing is used in the double speed check in line 2240 where DS is either 89 for "Y" to the question in line 1190 or 78 for "N". Try this in your own programs.

Now for the subroutines.

Lines 1000-1140 contain, as I am sure 99 per cent of you know, the text screen pokes. These are from 1024 to 1535 but the character codes are different from their ASCII equivalents. Also some non-ASCII characters are available — such as inverse numbers and space, etc.

Lines 1320-1440 and lines 1470-1630 are both routines for creating User Defined Characters. Doubtless most of you have had to listen to owners of lesser machines such as the Commodore boast of the few sprites available on it. Well, now you can create your own, and, with a little care, animate and control them just as well with GET and PUT plus one of the five options available (AND, NOT, etc). To create your own UDGs use 0 for a black pixel and 1 for a white, make FOR A=1 TO the number of rows, alter the DIMming, GETting and PUTting and run the subroutine.

Line 1800 contains EXEC 34091. This calls a ROM routine that waits until a key is pressed before continuing. Machine code users might like to note that the key pressed is held in the A register. JSR 34091:CMPA #keycode:BEQ . . . can be used to check for a certain key.

Lines 2100-2150 read the joysticks and PUT your fighter. This is done with EXEC &HBD52 which stores the joystick values in locations 346-349. Reading them this way is quicker than using the JOYSTK command. The fire button is checked for using (PEEK (65280) AND 1) as each

joystick has two values for the fire button. Using this saves the need for IF PEEK (65280) = 126 OR PEEK (65280) = 254 THEN . . .

This method is shorter, quicker, and allows keyboard control to be more easily augmented by replacing the memory locations used with those given later in the program.

Lines 2290 and 2340-2390 make an effective explosion by drawing concentric circles, gradually getting bigger, first in the foreground colour and then in the background colour to blank it out again. The Dragon's circles miss out some pixels when drawn like this and these pixels make the "debris" left after the explosion.

Lines 2440-2480 are the PAUSE and RETURN features. This routine may be typed into your own programs to add this feature, normally found on professionally written games. The routine must be called once a loop in a program.

Line 2610 caters for answers such as Y, YES, YEAH, etc in answer to a program.

To use the keyboard for control, follow the directions given in lines 2630-2700.

For those who write machine code programs I include, to round it all off, a listing of a basic program that will auto-exec one written in machine code. It has the advantage of being short and easy to use. Also it will exec the program if the RESET button is pressed.

To Auto-EXEC Machine Code programs use

10 CLOADM "your program"

20 POKE &H16B,PEEK(157): POKE&H16C,PEEK(158)

30 POKE &H16A,&H7E

40 'DESIGN TEXT LOADING SCREEN

50 CSAVEM "your program", &H16A, PEEK(126)*256+PEEK(127)-1,0

60 POKE &H16A,&H39:POKE&H16B, &H39:POKE &H16C,&H39

If you do not wish to CLOADM your program, omit line 10 and replace the PEEK (126)*256+PEEK(127)-1 in line 50 with the last address in your program.

To reload your program type CLOADM and press the enter key. The loading screen that you defined in line 40 will be displayed during loading. Loading takes about two minutes longer than usual but will auto-EXEC on loading and if RESET is pressed. Note that this method only works with machine code programs.

For those who do not feel like typing in the game, a cassette is available for £3.00 (cheque or P.O.) from Gareth Fenton, 206 South Lodge Drive, Southgate, London N14 4XN.

```
10 GOSUB 1000 'TITLE
20 GOSUB 1250 'SETUP
30 GOSUB 1830 'SELECT TARGET
40 FOR MY=0 TO 130 STEP 6-SL
50 PLAY "V31; L8; T175; 04; FGA"
60 GOSUB 2440 'PAUSE AND RETURN
70 GOSUB 2050 'MOVE BOMB
80 GOSUB 2090 'MOVE YOU
90 GOSUB 1970 'MOVE ENEMY FIGHTER
100 GDSUB 2170 'FIRE YOUR LAZER
110 GOSUB 2220 'INCREASE LEVEL
120 IF YOUHIT THEN GOSUB 2270 'EXPLODE
130 IF FINISHED THEN 2510 'END
140 IF THEMHIT THEN 30 'NEW BOMB
150 NEXT MY
160 GOSUB 2330 'EXPLODE BASE
170 IF NOT FINISHED THEN 30
180 GOTO 2510 'END
190
200
210 '
1000 PDKE65494,0
1010 CLS
1020 FOR A=1024 TO 1055: POKEA, 42: NEXT
1030 FOR A=1056 TO 1535 STEP 32:POKEA,42:NEXT
1040 FOR A=1087 TO 1535 STEP 32:POKE A,42:NEXT
1050 FOR A=1504 TO 1535: POKEA, 42: NEXT
1060 PRINT@34,"**********;
1070 PRINT@66,"*BOMBER*V2.7*";
1080 PRINT@98, "**********;
1090 PRINT@134, "**********;
1100 PRINT@166, "*WRITTEN**BY*";
1110 PRINT@198, "*********;
1120 PRINT@234,"***********;
1130 PRINT@266, "*GARETH*FENTON*";
1140 PRINT@298,"**********
1150 PRINT@418, "WHICH SKILL LEVEL (1 TO 6)?";:SL$=INKEY$:IFSL$="" THEN1150
1160 SL=VAL (SL$)
1170 IF SL>6 OR SL<1 THEN 1150
1180 SL=6-SL
1190 PRINT@32*13+1, "CAN YOU USE DOUBLE SPEED (Y/N)";
1200 DS=PEEK(135): IF DS<>89 AND DS<>78 THEN 1190
1210 PRINT@449,"*******please**wait********;
1220 RETURN
1230
1240 'variables
1250 DIM US(59)
1260 DIM ES(50)
1270 DIM BS (200)
1280 EF=40
1290 H=1
1300 PMODE4,1:PCLS
1310
1320 'define enemy fighter
1330 DATA 00000000001111100000
1340 DATA 0000000000111111110000
1350 DATA 0000000011111111111100
1360 DATA 000111111111111111111
1370 DATA 1111111111111111111111
```

```
1380 FDR A=1 TD 5
1390 READ A$(A)
1400 FDR B=1 TD 21
1410 PSET (B,A+5,VAL(MID$(A$(A),B,1)))
1420 NEXT B,A
1430 BET (0,0)-(21,15),BS
1440 PCLS
   1460 define enemy bomb

1470 DATA 00011000

1480 DATA 01011010

1490 DATA 01011100

1500 DATA 11111111

1510 DATA 10011001

1520 DATA 10011001

1530 DATA 01100110

1540 DATA 11100111

1550 DATA 11100111

1550 DATA 11111111

1570 FOR A=1 TO 10

1580 READ A#

1590 FOR B=1 TO LEN(A#)

1600 PSET (9+B,9+A,VAL(MID*(A*,B,1)))

1610 NEXT B

1620 NEXT A

1630 GET (10,0)-(18,20),ES
   1650 'set up bases

1660 PMDDE3,1:PCLS

1670 CDLDR2,1

1680 LINE(130,150)-(160,160),PSET,BF

1790 LINE(210,150)-(200,160),PSET,BF

1710 CDLDR3,1

1720 LINE(2128,160)-(256,192),PSET,BF

1730 LINE(128,160)-(256,192),PSET,BF
   1740 'define your fighter'
1750 PMODE4,1
1750 PMOPE4,1
1750 PMS*R3FSR10E5R7R3FR3FR3FR3GL3GL3GL3GL3GL3L33U7*
1770 DRAM*BM10,10;XHU$;"
1780 PAINT(12,13)
1790 BET (10,0)-(60,30),US
1800 PRINT@449,"******************;:EXEC34091:SCREEN1,1
1810 RETURN
   1830 'select target
1840 THEMHIT=0
1850 SF=0
1850 SF=0
1860 G=RND(3)
1870 ON 8 GOTD 1880,1900,1920
1880 IF BA(1)=2 THEN 1900
1890 FX=143:6=1:80TD 1940
1900 IF BA(2)=2 THEN 1920
1910 FX=183:6=2:GOTD 1940
1920 IF BA(3)=2 THEN 1880
1930 FX=223:8=3
1940 MY=0
1950 RETURN
1960 '
  1970 'enemy fighter move

1980 IF UX+10<EF+5 THEN EF=EF-5:ST=0

1990 IF UX+10 >EF+5 THEN EF=EF+5:ST=0

2000 PUT(234,EF) - (225,EF+15),BS

2010 IF EF+5=UX+10 THEN ST=ST+1

2020 IF ST)SL THEN YOUHIT=-1

2030 'RETURN'
   2050 'move bomb
2060 PUT (FX,MY)-(FX+7,MY+20),ES
2070 RETURN
 2080 'move your fighter

2090 'move your fighter

2100 EXECUMBD52

2110 IF PEEK (347)<20 THEN UX=UX-10:IF UX<0 THEN UX=0

2120 IF PEEK (347)>40 THEN UX=UX+10:IF UX>130 THEN UX=130

2130 IF (PEEK (55280) AND1) =0 THEN FB=2

2140 PUT (10,UX)-(60,UX+30),US

2150 RETURN

2160
```

```
2170 'fire and check for hit 2180 IF F8=2 AND SF(3 THEN LINE(60,UX+15)-(FX,UX+15),PSET:LINE(60,UX+15)-(FX,UX+15),PRESET:FDR A=1 TD 3:PLAY*T100;L8;05;EFBAB*:NEXT A:SF=SF+1:IF PPOINT(FX,UX+14) = 5 THEN H=H+1:DC=2:LH=LH+1 2190 IF DC=2 THEN DC=0:LINE(FX-8,MY+4)-(FX+4,MY+20),PRESET,BF:PLAY*V31;04;L8;T12 5;CDEFBABC*:THEMHIT=-1 2200 F8=0 2210 'F8=0 2210 'F8
 2220 'level increase
2230 IF LH=10 THEN SOUND 50,5:LH=0:SL=SL-1:IF SL=0 THEN SL=5
2240 IF SL<4 THEN POKE 65495+(DS=78),0
2250 RETURN
    2270 'your fighter destroyed
2280 YOUHIT=0
2290 LINE (234,EF+9)-(60,UX+15),PSET:FOR A=1 TO 5:PLAY"V31;T75;D5;LB;BAGF":NEXT A
:LINE (234,EF+9)-(60,UX+15),PRESET:FOR A=0 TO 35:CIRCLE (35,UX+15),A,5,0.15:NEXTA:
SD=SD+1:FOR A=0 TO 35:CIRCLE (35,UX+15),A,0,0.15:NEXTA:ST=0:SF=0
2300 IF SD=5 THEN FINISHED=-1
2310 RETURN
2320 'YOUR FIGHTED FINISHED=-1
 2330 'base destroyed

2340 FDR A=1 TD 20

2350 CIRCLE(FX,150),A

2360 NEXT A

2370 FDR A=1 TD 20

2380 CIRCLE(FX,150),A,0

2390 NEXT A

2400 BA(S)=2

2410 BH=BH+1:IF BH=3 THEN FINISHED=-1

2420 RETURN

2430 'pause and return

2450 PR=PEEK(IJS5)

2460 IF PR=B0 THEN EXEC34091

2470 IF PR=B0 THEN RUN

2480 PGEEL35,0

2490 RETURN
 2510 'qame over
2520 FOR A=250 TO 1 STEP-5
2530 SOUND A,1
2540 NEXT A
2550 SOUND 1,5
2560 CLS:PRINT@10,"BAD LUCK"
2570 PRINT:PRINT" LEVEL";6-SL
2580 PRINT:PRINT" YOU LOST";SD;"OF YOUR SHIPS"; PRINT" AND YOU LOST";BH;"OF
YOUR BASES"
2590 PRINT:PRINT:PRINT:PRINT= AND YOU STOPPED";H-1;"BOMBS"
2600 PRINT:PRINT:PRINT:INPUT"ANDTHER GO";A#
2610 IF LEFT#(A#,1)="Y" THEN RUN ELSE POKE65494,0
 2720
3000 'BASIC PROBRAM AUTO-RUN
3010 A$="8a3787016A9E7E301F9F1BBDB41FBDB3ED7EB49F39"
3020 B=999
3030 FDR A=1 TO 43 STEP 2
3040 B=B+1
3050 PDKEB,VAL("%H"+MID$(A$,A,2))
3060 NEXT A
3070 PDKE$H166B,3
3080 PDKE&H166C,%HEB
3090 CLS:PRINT'F AUTO-RUN"
3100 PDKE&H16A, &H7E
3110 CSAVEM'AUTO-RUN", %H16A,PEEK(27)*256+PEEK(28),0
3120 PDKE&H16A,&H39
3130 END
```



SUPPORT YOUR DRAGON DEALER

Microdeal have been supplying software and accessories for 5 years and when you place an order you can be confident that it will be supplied. Why take a chance with other mail order companies when you can rest assured when placing your order with Microdeal.

ALL THE TOP SELLERS AVAILABLE FROM

TREKBOER

From Microdeal

EDDIE STEADY GO

from Incentive

JUXTA POSITION

from Wintersoft

DARK STAR

from Design Design

SHOCK TROOPER

From Microdeal

5 star rated graphic adventure. The latest release from Microdeal

£8 (P & P 75p per order)

Total Price £8.75

5 star rated 22 screen arcade game

£6.00 (P & P 75p per order)

Total Price £6.75

5 star rated adventure with 32,000 3D views

£6.20 (P & P 75p per order)

Total Price £6.95

3D arcade game 5 star rated "graphically stunning"

£5.20 (P & P 75p per order) Total Price £5.95

16 screen Hi-Res arcade game. Our biggest seller on our Roadshow

£8 (P & P 75p per order)

Total Price £8.75

THIS MONTHS SUPER SPECIALS!

MICRODEAL WORLDS OF FLIGHT MICRODEAL DRACONIAN SOFTWARE PROJECTS SET WILLY DESIGN DESIGN DARK STAR INCENTIVE BACK TRACK NOW £4.95 MICRODEAL NOW £4.95 SOFTWARE

MICRODEAL DOWNLAND SOFTWARE PROJECTS MANIC MINER

ADDICTIVE FOOTBALL MANAGER

DESIGN DESIGN ROMMELS REVENGE INCENTIVE EDDIE STEADY GO

NOW £2.00 NOW £6.00

NOW £5.00 NOW £5.95 NOW £6.00

NOW £6.00

CRAZY A & F'S SCREAMING ABDABS
WAS £6.90 NOW ONLY £2.50

NOW £6.00

NOW £6.00

NOW £5.00



Issue of our Big Dragon Magazine
The "CUTHBERT CHRONICLE" simply send us
a large S.A.E. with your name address and postcode.

Remember to add 75p Post & Packing just once.

The Joyful Dragon

The mysteries of joystick operation explained by Pam D'Arcy

A JOYSTICK provides two values for a Dragon programmer to use in whatever manner he or she chooses. There is a value relating to a horizontal, or X axis and one relating to a vertical, or Y axis. Both values are in the range 0-63. If like me you have an old Dragon manual, ignore the JOYSTK information and digest the follow-

The Joystick values are placed by the BASIC interpreter in four of its workspace locations. Use of the JOYSTK function copies the appropriate value from BASIC workspace into your variable, see Table One.

There is a routine in ROM (at address \$8012) that updates these locations. It is only entered from a BASIC program when JOYSTK(0) (or EXEC &H8012) is used. This applies even if you are only using the left joystick or you are only interested in vertical axes. It is rather like the keyboard and its roll-over allowance — if the joystick readings were updated on every JOYSTK command (or even more frequently), the action may never be frozen for long enough to determine the meaning of the joystick movement to your program.

TYPES OF JOYSTICK

ANALOGUE OR ROLLER-BALL OR TRACKER-BALL are the ones able to give you, theoretically, all possible values. 0-63, in both directions. I say theoretically

because, says my more scientific husband, the guts of a joystick are Potentiometers and they may vary slightly even between joysticks produced by one manufacturer, perhaps not being able to send the full range of signals to the Dragon. Basically, wherever you have your joystick physically pointed to, the JOYSTK(0) command will update the locations for both joystick ports (although the values will be meaningless where no joystick is plugged in). Some advertisements may include the words 'Linear Potentiometer'. This is the basis on which one would expect analogue jovsticks to work - that movement of the joystick in a line gives regular increments/ decrements in the values as the stick progresses along that axis. One would expect the following readings (Table Two) from an analogue or ball-type joystick (the latter type having a large sort of ballbearing in a socket that you roll around with the palm of your hand SWITCHED JOYS-TICKS determine readings by a number of 'switches' contained within them, activated by moving a stick. The number of obtainable values is determined by the number of switches alone, often eight plus centre.

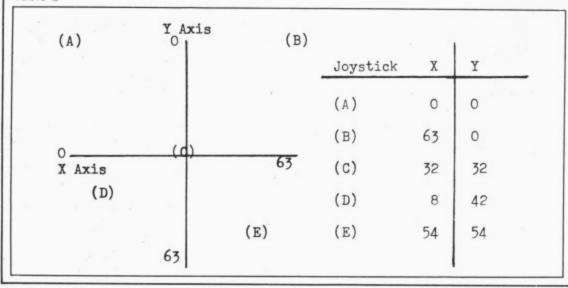
of buttons connected through the joystick port that, with a small handler program, we could use as a hex pad for fast and simple input of hex data?

As an aside, how about a 16 position box

Table 1

	Dec.	&H	\$
JOYSTK(0) Right joystick horizontal	346	15A	15A
JOYSTK(1) Right joystick vertical	347	15B	15B
JOYSTK(2) Left joystick horizontal	348	15C	15C
JOYSTK(3) Left joystick vertical	349	15D	15D

Table 2



SELF-CENTERING JOYSTICKS have no effect on readings apart from giving the user a guaranteed (one hopes!) return to the centre point (32,32) on releasing the stick, as it springs back to its 'home' position.

USING JOYSTICKS IN PROGRAMS

The use that you put the readings to is entirely a matter for you. I recall that in a previous Dragon User article someone suggested that, unfortunately, a lot of the sensitivity of joysticks is programmed out of them. Using hubby's-built analogue, non-self centering joysticks, I find that the required control can be too sensitive. particularly where a return to centre is demanded before allowing a change of direction in screen-portrayed movement. This can be tricky to achieve, particularly by the young ones in so-called 'educational programs' - mine often give up in dusgust because they cannot understand the mechanics as they move the stick in the right direction - but the program doesn't respond. I feel that less sensitivity about the centre point could be a distinctive plus in such software! I hope you now realise why sometimes advertisements for switched joysticks state that they 'work with most games' - if a game is dependent upon a value/set of values that cannot be returned . . .

JOYSTICK DEMONSTRATION PROGRAM

I knocked up this program really as a quick demonstration of using joysticks in machine code. However, it has proved to be an invaluable quality tester of our joysticks - revealing a weakness along three particular axes that we hadn't previously realised, which is why I suddenly realised that it could be invaluable to you to take it with you to check out potential joystick purchases! The kids have played with it for hours (mainly trying to paint the entire screen blue - quite a feat in joystick control - good job the joysticks are as tough as the kids!).

What it does is to relate each reading that it gets back for the right-hand joystick to the graphics screen. As discussed above, analogue joystick readings are 0-63 in both directions.

The screen is 256 pixel columns horizontally by 192 pixel rows vertically. If each possible analogue joystick reading colours a block of pixels to eventually fill the screen, each possible different reading represents a four (256/64) column by three

(192/64) row block of pixels on the screen which is then coloured blue. The machine code part of the program loops round updating the readings (JSR \$8012), tracking the movement of the right-hand joystick on the screen, until the FIRE button is pressed. It then exits back to the BASIC part of the program and the graphics screen sits there until S (Start) or Q (Quit) is pressed.

If using switched type joysticks, only the blobs for the available number of different readings-switch positions plus centre will be given. (It thus tells you the number of switchable positions available in the joystick if it is not stated on the pack).

The BASIC program (Listing 1 — JOYS-TICK) is pretty self-explanatory. When RUN, after setting up the machine code routine, the PMODE3 screen is cleared to green awaiting a keypress. When S is pressed, it clears to yellow and enters the machine code. The machine code traces the path of the joystick in blue until the bit of the byte. If either or both resulting FIRE button is pressed.

If you don't yet have joysticks, RUN the program to ensure that it has been typed in OK. 'S' displays a yellow screen containing a small blue trail (whatever values have been deigned to have been given to you in the absence of joysticks until the readings settle). Press RESET to exit from the program.

THE FIRE BUTTON. The location as mentioned in the Dragon manual is the one used to detect fire button presses (65280, &HFF00; \$FF00). Only one bit out of the eight bits of a byte is actually used for each joystick and a better (much faster) way of detecting a press than the method in the manual is to use Smeed and Somerville's technique in Inside the Dragon. The bit being checked is zero if the button is pressed.

FIRER = PEEK (65280) AND 1 FIREL = PEEK (65280) AND 2

The AND 1,2 is isolating the appropriate values are zero, that particular joystick (or

both) has the fire button pressed. If you can get into the HEX HABIT, PEEK(&HFF00) rather than the decimal PEEK(65280) is a substantial timesaver in BASIC.

The Dragon actually uses one of the keyboard scanning locations to store the fire button information in, so keyboard plus joystick control has to be carefully planned to avoid conflict.

For those wishing to peruse the source of the machine code routine without having to disassemble, I have enclosed the DSKDREAM (available from Grosvenor Software) assembler listing (Listing 2 -JOYWRITE). The JOYWRITE source was entered after a CLEAR200.&H5000.

The demonstration program takes into account the differing graphics page RAM start addresses for disk and cassette systems by loading the last PMODE's page RAM address (default prior to a PMODE command = PAGE1) from the appropriate BASIC workspace variable, \$BA,\$BB.

I wish you joy with your joysticks.

Listing 1

10 REM JOYSTICK PROGRAM (C) PAM D'ARCY 20 CLEAR200,32000 30 CLS:PRINT"LOADING MACHINE CODE" 40 FOR MC=32000 TO 32082 50 READ D\$ 60 CSUM=CSUM+VAL("&H"+D\$) 70 POKE MC, VAL ("&H"+D\$) 80 NEXT MC 90 IF CSUM<>9527 THEN PRINT"ERROR IN DATA STATEMENTS": END 100 DATA 34,76,BD,80,12,10,9E,BA 110 DATA B6,01,5B,BB,01,5B,BB,01 120 DATA 5B,C6,20,3D,31,AB,B6,01 130 DATA 5A,44,31,A6,C6,F0,86,01 140 DATA B4,01,5A,27,02,C6,0F,1F 150 DATA 98,C4,AA,34,04,43,1F,89 160 DATA A4,A4,AA,E4,A7,A4,1F,98 170 DATA A4,A8,20,AA,E4,A7,A8,20 180 DATA 1F,98,A4,A8,40,AA,E0,A7 190 DATA A8,40,86,01,84,FF,00,26,81,35,F6 200 PCLEAR4 210 MCODE=32000 220 PMODE3,1 230 PCLS1 240 SCREEN1,0 250 K\$=INKEY\$: IF K\$="" THEN 250 260 IF K\$="S" THEN PCLS2:EXEC MCODE:GOTO250 270 IF K\$<>"Q" THEN 250

Listing 2

5001					- 7D	ME BBØ15B		ADDA	JOYRY	7030	0404	ANDA	Ø, Y
7DØØ	7DØØ		ORG	32000	7D	11 C620		LDB	#32	7D32			
7DØØ			PUT	#5001	7D	13 3D		MUL	100000	7D34		ORA	0,5
7DØØ					7D	14 31AB		LEAY	D.Y	7D36		STA	Ø, Y
7DØØ	8012	JOYSTK	EQU	\$8012	7D	6 B6015A		LDA	JOYRX		A4A82Ø	TFR	B,A
7DØØ	Ø15A	JOYRX	EQU	\$15A	- 7D	19 44		LSRA	001111	7D3B		ANDA	32,Y
7DØØ	Ø15B	JOYRY	EQU	\$15B	7D	A 31A6		LEAY	A.Y			ORA	Ø,S
7DØØ	FFØØ	FIREB	EQU	*FF00	7D	C C6FØ		LDB	##FØ		A7A82Ø	STA	32,Y
7DØØ	ØØAA	COLOUR	EQU	#AA	7D	E 8601		LDA	#\$01	7D4Ø		TFR	B,A
7DØØ	ØØBA	GPAGAD	EQU	#BA		20 B4015A		ANDA	JOYRX		A4A84Ø	ANDA	64,Y
7DØØ				100000		23 2702		BEQ	JOYB	7D45		DRA	Ø,S+
7DØØ	3476	JOY	PSHS	D.X.Y.U		25 C6ØF		LDB	#\$ØF		A7AB4Ø	STA	64,Y
7DØ2				-,-,-,-		7 1F98	JOYB	TFR	B.A	7D4A		LDA	#\$01
7DØ2	BD8012	JOYA	JSR	JOYSTK		29 C4AA	0010	ANDB	#COLOUR		B4FFØØ	ANDA	FIREB
7DØ5	109EBA		LDY	GPAGAD		2B 34Ø4			B	7D4F	26B1	BNE	JOYA
7DØ8	B6Ø15B		LDA	JOYRY		2D 43		COMA	ь	7D51			
	BBØ15B		ADDA	JOYRY		E 1F89		TFR	A.B	7D51 7D53	35F6	 PULS	D,X,Y,U,PC

280 CLS: END

A DIVISION OF MICRODEAL LTD

SALAMANDER SIX PACK

Golf - Games Pack 1 - Grid Runner

Laserzone - Night Flight - Wings of War

We reserve the right to change titles in

this six pack.

Now only **£5.00**

SHARDS SPECIAL 4 PACK

Pettigrews Diary - Family Programs Mystery of Java Star - Monster Maths

P & P 75p per order

Regular price of six programs £47.70



TANDY TOUCH TABLET

For Tandy Colour/Dragon 32/64 This touch pad for graphics is ideal for creating free hand graphics. The Dragon version comes with a converter lead and simple screen draw program. A knowledge of basic programming is required to write programs for the more advanced graphics.

£69.00 P&P75p

PRESTEL MODEM KIT



Use your Dragon for Prestel. This modem kit comes with a plug in modem rom pack that plugs into your cartridge port plus a prism modem. The kit includes 3 months subscription to Micronet/Prestel.

Regular price

introductory offer

P & P 75p

2 JOYSTICKS

MICRODEAL JOYSTICKS Available in both analogue * & digital versions. The analogue (floating) version is essntial for our top flight simulator "Worlds of Flight". Both joysticks are strong and made in England.



Self Centring (Digital)

19.95

per pair

(analogue) £15.00 per pair Add 75p P & P per order

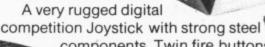
SHOT/JOYSTICK



Dragon/Tandy Colour Version each

£10.99 P & P 75p

ZIP STICK COMPETITION



components. Twin fire buttons 90% British £10.99 each P&P75p

Includes:

Regular price of

4 programs

£29.80

Now only

£3.50

P & P 75p per order

QUICK SHOT 2 JOYSTICK

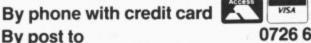
Digital Joystick for Dragon 32/64 & Tandy Colour Twin fire buttons - Rapid Fire Button - Fast Action - Rugged Construction - The Ultimate Joystick for your Dragon/Tandy colour

£14.95 each P&P75p

Add 75p Post & Packing per order.



For Orders use our 24 hour system









41 Truro Rd, St. Austell, Cornwall PL25 5JE

Dragon Logic

True or False - Logic on the Dragon explained by John Boyes

THE WAY in which the Dragon's Basic interpreter deals with comparisons as part of IF statements is very interesting and, more importantly, can help the programmer open up some novel programming techniques. Most Dragon users will be aware of the logical operators AND and OR when applied to compound *IF* statements, eg IF A = 1 AND B = 0 OR C = 0 THEN . . <action> . .

but very few will be aware that these logical operators can also be used in a similar way to $+ - \stackrel{\land}{x}$ and /.

To understand how this is done and what the significance of it is, we must first explore the way in which the Dragon deals with such entities as *TRUE* or *FALSE*.

In the above example the Dragon would first look at the expression A=1 and decide, from the current value of A, whether in fact the expression is TRUE or FALSE (ie whether A is indeed equal to ONE or not). If TRUE, the expression is given the value -1 and if FALSE it is given the value 0.

The reason that -1 is used to denote *TRUE* is that it represents every binary bit set in the integer that represents the logic value

For example, if two bytes were used to represent an integer value then the highest value it could attain would be &HFFFF.

Now, as numbers are represented in two's complement arithmetic, the most significant bit is treated as a sign bit, a binary 0 indicating a positive number and a binary 1 indicating a negative number. If we were to add one to &HFFFF we would obtain the result &H0000 because the 1 would be carried right through to bit 17. In view of the fact that we are dealing with 16-bit numbers, this 1 will roll off the end into the carry register leaving us with the result zero. Therefore &HFFFF represents one less than zero which is -1.

Getting back to our example, the second thing the Dragon would evaluate is the truth or otherwise of the expression B = 0. The next step would be to AND the two logical results of the expressions. To do this the Dragon looks at each bit of one result and compares it with the corresponding bit of the other and if both bits are set it returns the corresponding bit set in the final result word. This means that if both results were TRUE, ie -1, the AND of the two results would also be TRUE but if either were FALSE then the final result would also be FALSE. The next step would be to evaluate the expression C = 0 as TRUE(-1) or FALSE (0) and OR the result with the value already obtained from A = 1 AND B = 0. The OR operation is accomplished by comparing each bit of the two logical values but, unlike the AND, a one bit is returned if the appropriate bit in either word is set to

Having done all this the Dragon is left with a logical result which is either *TRUE* (-1) or *FALSE* (0) and on this basis it knows whether or not to carry out the *action* part of the IF statement. In actual fact the expression in an *IF* statement can be a single variable and the "expression" will be considered to be *TRUE* if the value of that variable is NOT zero. So, for example, the statement:

IF X THEN PRINT "The statement is true." is perfectly acceptable to Dragon Basic and will cause the string to be printed for every case of X except when X = 0. This principal is particularly useful for checking joystick fire buttons as follows;

IF NOT PEEK (65280) AND 1 THEN PRINT "R PRESSED"

IF NOT PEEK (65280) AND 2 THEN PRINT "L PRESSED"

The advantage of this method is that it automatically accounts for whether the value of the PEEK has the most significant bit set or not and is thus much neater to program than the method given in the Dragon manual.

In the above example the Dragon performed an AND between the result of peeking location 65280 and the number 1 or 2 as appropriate. This means that it can do the same thing with ordinary numbers as it did with the values given to TRUE(-1)and FALSE (0). For example if we entered PRINT 3 AND 5 the answer returned would be 1. To understand how this works the numbers should be converted to their binary form so 3 would become 0011 and 5 would become 0101 when expressed as 4-bit words or "nibbles." If we look at these two binary numbers we note that the only bit which is set in both is the least significant bit which represents the value 1 and hence this is the value returned for the expression 3 AND 5. If we took the same numbers as above and applied the OR operator we would obtain the answer 7 or 0111 because each bit is set if either or both of the corresponding bits in the two given numbers are set.

Logical operations as shown above are limited to integers (whole numbers) in the range +32,767 to -32,768. The reason for this is that the Dragon can only preform logic operations on integers up to sixteen bits (two bytes) long and even then it considers the most significant bit to be the sign bit. The significance of this is perhaps best explained by considering the NOT operator. The NOT operator returns the value which is given by changing all the ones for zeros and all the zeros for ones, this is also referred to as taking the complement of the number. For example TRUE is represented by -1 or, in binary 1111111111111111, If we NOT -1 we change all the ones for zeros and the result would become zero which we know represents *FALSE*. This is of course what we would have expected because *NOT TRUE* must mean *FALSE*.

Life gets a little more complicated when we ask the Dragon to work out NOT 5. As we saw earlier, in 4-bit binary 5 would be 0101. When we take the complement of this number and replace the ones with zeros and the zeros by ones we get 1010. In practice this is just the least significant part of a sixteen-bit word and when we invert it all of the most significant bits become set to one. If we were to add 6 or binary 0110 to this result we would obtain the answer zero with a one carried right through to the 17th bit and hence ignored. The result we obtained for NOT 5 therefore was six less than zero or -6. Thus the effect of the NOT function on a decimal number is to change the sign of that number and subtact one

There is another logical operator, the XDR or exclusive OR, (sometimes written EOR) but this is not directly implemented on the Dragon. To understand what it is we need to look at the truth tables of AND, OR and XOR for two variables A and B. (Note that truth tables use a 1 to represent TRUE, not -1 like the Dragon).

A	В	AND	A	В	OR	A	В	XDR
0	0	0	0	0	0	0	0	0
0	1	0	0	1	1	0	1	1
1	0	0	1	0	1	1	0	1
1	1	1	1	1	1	1	1	0

From the truth tables it will be seen that the OR function includes the AND function by default when A and B are both ones, but the exclusive OR is a special case of the OR function which excludes the implied AND. As an example take 3 XOR 5. As binary nibbles these numbers are; 0011 and 0101 and the normal OR operator would result in 0111 or 7. Note, however, that the least significant bit in both numbers is set to one so, because this condition would also satisfy the AND operator, it is excluded and the result become 0110 or 6. One way to obtain the XDR operator on the Dragon is to use an expression like; (A OR B) AND NOT (A AND B).

This is a bit cumbersome so in practice one would use;

(A OR B) - (A AND B).

If the *OR* is *TRUE* and the *AND* is *FALSE* then the result would be -1 minus 0, which is -1 or *TRUE* as we would expect, but if the *AND* is also *TRUE* we would get a -1 minus -1 which evaluates to zero or in logic *FALSE*.

The situation where the *DR* is *FALSE* and the *AND* is *TRUE* is logically impossible — think about it! Thus the minus sign is a useful shorthand way to obtain the logical expression *AND NOT*.

A DIVISION OF MICRODEAL LTD

MICROPEAL STITUY NINT SHEET	(INC VAT)	(EX VAT)
*AEPLACEMENT OISSETTE LEAD FOR DRAGOM/TAMDY *TAMDY TPIO THERMAL PRINTER *TAMDY TPIO THERMAL PRINTER *TAMDY DMP 103 DOT MATHIE PRINTER *TAMDY DMP 120 DAILY WIEEE PRINTER *TAMDY DRAFT 220 DAILY WIEEE PRINTER *TAMDY TREPLACEMENT RIBBOM FOR BRAIDS PRINTER *TAMDY TREACTOR FEED FOR DWF 220 PRINTER **TAMDY TRACTOR FEED FOR DWF 220 PRINTER **TAMDY TRACTOR FEED FOR DWF 220 PRINTER **SECTRONIC BOOK BOAPPOR		1.00 NEW LIME 20.00 NEW LIME 20.00 NEW LIME 10.57 NEW LIME 15.00 NEW LIME 13.00 NEW LIME 13.00 NEW LIME 90.03 NEW LIME 13.03 NEW LIME 13.03 NEW LIME 92.13
"AICHODEAL FLOATING JOTSTICES (PAIR) "AICHODEAL FLOATING JOTSTICES (PAIR) "AICHODEAL FLOATING JOTSTICES (PAIR) "AICHODEAL SELP/CENT JOTSTICES (PAIR) "AICHODEAL CENTROLICE FRINTER CABLE "AICHODEAL CENTROLICE FRINTER CABLE "AICH PACK WITH HODEN 1000 POM 12 ON 64 "HOOTE, FRIST COVER USE WITH MODEN PON 32/64 "PHOTES (FUST COVER) THE PARAGON "SPECTRAVISION GUICKSHOT I PUN DRAGON "THOLICE THE PEN DRAGON THE PEN DR	15.00 19.95 12.99 69.95 19.99 14.95 17.25	11.04 17.15 11.30 60.81 17.34 COMING SOON 2.60 SOLD WHEN GONE 13.00 15.00
DMAUON ELNICATIONAL SOFTWARFSCORES		
MICROPEAL MACHINE LANGUAGE TUTGRIAL MICROPEAL MACHINE/L/TUTGR PREMIER DOS DISK MICROPEAL MACHINE/L/TUTGR PREMIER DOS DISK MICROPEAL MACHINE/L/TUTGR PREMIER DOS DISK MICROPEAL MACHINE/L/TUTGRIAN DALAMADER TUTTLE GRAPHICS DRAGGE DOS DISK SALLAMADER TUTTLE GRAPHICS PREMIER DOS DISK SAMANDS PARILY PROGRAMS	15.00 19.95 19.95 4.99 4.99 9.95	11.04 17.35 GOMING SOON 17.35 COMING SOON 4.36 4.30 8.65 COMING SOON 6.65 GOMING SOON
ORANUS HOMSTER MATHS	9.95 9.95 6.95	8.65 COMING SOON 8.65 COMING SOON 6.04
MICRODEAL FILMASTR CASSETTE MICRODEAL TELEVRITER MORD PROCESSOR CASSETTE	9.95 9.95 9.95	8.65 SOLD WHEN GONE 8.65 8.65
DAGOM BUSINESS PROGRAMS MICRODEAL TILLBUSTE GASETTE MICRODEAL TILLBUSTER WORD PROCESSOR CASSETTE DAGOM AS TELEVALITER WORD PROCESSOR DISK FOR: REAGON AS TELEVALITER UPGRADE TO DISK FOR: REAGON AS TELEVALITER WORD FOR PERKIER DISK MICRODEAL TELEVALITER WORDER TO PERKIER DISK MICRODEAL TELEVALITER OF STELEVALITE GASETTE SALAMANDER DATA RETRIEVAL DRAGON DOS DISK SALAMANDER DATA RETRIEVAL DRAGON DOS DISK		8.65
	9.95 2.50 14.95 19.95	17:35
MICROPEAL COMPOSER PRACOW DOS DISK MICROPEAL COMPOSER PRACOW DOS DISK MICROPEAL COMPOSER PREMIER DOS DISK MICROPEAL COMPOSER PREMIER DOS DISK MICROPEAL CORRES DISTOR ASSEMBLER TAPE MICROPEAL PROGRAMMERS UTILITIES MICROPEAL RAIMBOW MRITTER CASSETTE MICROPEAL TELE-ARTIST MICROPEAL TELE-ARTIST MICROPEAL TELE-PORTH 0433ETTE SALAMANDERS GRAPHICS 333TEM	15.00 19.95 19.95 19.95 8.00 8.00 9.95 4.95	13.04 17.35 37.35 37.35 6.96 6.65 5.30 8.65 3.30
DRAGON PREMCH PROGRAMS SALAMARDER MAGNET PREMCH SALAMARDER HIGHT PLIGHT PREMCH SALAMARDER HIGHT PLIGHT PREMCH SALAMARDER HIGHT PREMCH SALAMARDER VILANDE LAIR PREMCH	4.95 4.95 4.95 4.95	
SALAMANDER MILARUS LAIR PRENCH	1.95	4.30 4.30 4.30 4.30
DEAGON GARES SOFTWARE B DENOTES PROGRAMS TO BUN ON DRADON & TANDY ADDICTIVE POOTBALL MANAGER A P ROFTWARE	1.01	
A P OUTTWARE CHUCKIE EGG A P SCREAMING ABDABS CUTHBERT CHROWICLE SKID ROW ADVENTURE CUTHBERT CHROWICLE TREAURES OF BARROOM	5.95 7.90 2.50 1.00	5.17 SPECIAL OFFER 6.67 SPECIAL OFFER
A DESCOTES PROGRAMS TO ROW ON DRAGOM & TARDT A DOISTIVE PROGRAMS TO ROW ON DRAGOM & TARDT A 1 F SOFTWARE AND	1.00 5.20 6.00 3.00	3-17 SPECIAL OFFER 0-87 COMING SOOM 1-92 SPECIAL OFFER 1-92 SPECIAL OFFER 1-92 SPECIAL OFFER 1-95 SPECIAL OFFER
MIGROEAL ALE TRAIDED CONTROL MIGROEAL ALGATRAZ MIGROEAL ALGATRAZ MIGROEAL ATHLETYX	5.00 6.00 9.95 4.95 8.00	5.65 SPECIAL OPPER
MICHODEAL BEAR RIDER MICHODEAL/DRAGON DATA BLOC HEAD \$ 32K	4 - 95 4 - 95 4 - 95 6 - 00	4.30 4.30 4.30
MICHODEAL CAVERNS OF DOOM #ICHODEAL CHAMBERS #ICHODEAL COSMIC EAP #ICHODEAL CASH	4.95	6.96 4.30 4.30
MICHODERAL CHALY PAINTER MICHODERAL CHAIT TEN PACK MICHODERAL CUTHBERT IN THE COOLER \$ 3PK	7.50	6.96 8.30 6.52
MICRODEAL CUTHBERT IN THE HIMES MICRODEAL CUTHBERT IN SPACE MICRODEAL CUTHBERT IN SPACE MICRODEAL CUTHBERT IN SPACE DRAGOW DOS DISK	8 - 95 8 - 95 8 - 95	8.30 4.30 6.96
MICRODEAL CHAMBERS MICRODEAL COASIG EAP MICRODEAL CRASH PAINTER MICRODEAL CRASH PAINTER MICRODEAL CRASH PAINTER MICRODEAL CRASH PAINTER MICRODEAL CHASH PAINTER MICRODEAL CUTTHERT IN THE COOLER MICRODEAL CUTTHERT IN THE MINES MICRODEAL CUTTHERT IN THE MINES MICRODEAL CUTTHERT GOES DISGUING MICRODEAL CUTTHERT GOES WALE DRAGOW DOS DISK MICRODEAL CUTTHERT GOES WALE ABOUT MICRODEAL CUTTHERT GOES WALE ABOUT MICRODEAL CUTTHERT GOES WALE ABOUT MICRODEAL DAWGER RANGER PARMIER DOS DISK MICRODEAL DAWGER RANGER PREMIER DOS DISK MICRODEAL DEWGLITION DERBY MICRODEAL DEWGLITION DEWGL	0.00 8.95 8.95 9.95 9.95 9.95 8.95 6.95	8.65 COMING SOOM 0.86 SPECIAL OFFER 4.30 SPECIAL OFFER 8.65 COMING SOOM
MICHODEAL DANGER RANGER DRAGON DOS DISK MICHODEAL DANGER RANGER PREMIER DOS DISK MICHODEAL DEFEMSE	6.95	6.04
MICHODEAL DEMON SEED DESIGN MICHODEAL DEVIL ASSAULT MICHODEAL DRAGGE DATA DOODLE BUG \$ 32K	4.95 4.95 4.95	4.30 4.30 4.30
MICRODEAL DRACONIAN MICRODEAL DRAGON MAWK MICRODEAL DUNGEON RAID	0 - 95 4 - 95 4 - 95 2 - 00 4 - 95 2 - 00 8 - 95 6 - 95 8 - 00	COMING SOON 1 30 1 30 1 30 1 30 1 30 1 30 1 30 1 30 1 30 2 30 2 30 3 30 4 30 5 30 6 30 6 30 6 30 6 30 6 30 6 30 6 30 6 30 6 30
NICROBEAL DUNGEN AND NICROBEAL DUNGEON PAID DRAGON DOS DISK NICROBEAL EIGHT BALL NICROBEAL EIGHT BALL NICROBEAL DOS DES DISK NICROBEAL ESCAPE L DIABLERO MO INLAY 8 JRK NICROBEAL ESCAPE L DIABLERO MO INLAY CARD)	6.95 8.00 0.99	0.86
	0.99 4.95 0.99 4.95 4.95 4.95 4.95 4.95 4.95 6.00	6.30 0.86 4.30
HIGHOMEAL GALACTIC AMBUSH HIGHODEAL/DRAGON DATA GHOST ATTACE-NO INLAT HIGHODEAL/DRAGON DATA GHOST ATTACE-NO INLAT HIGHODEAL GLASSONS	4.95 9.99	4 - 30 4 - 30 4 - 30 4 - 30 0 - 86 6 - 30
ICRODEAL GOLP DRAGOM DOS DISK ICRODEAL GRAPER ICRODEAL GRABBER	4.95 7.95 8.00	4.30 4.30 6.65 COMING SCON
ICRODEAL INTERGALACTIC FORCE ICRODEAL INVADERS REVENCE	9 - 95 4 - 95 4 - 95 4 - 95 6 - 95 8 - 95	8.65 COMING SOON 4.30 4.30
HIGHORIAL PRODUCE HIGHORIAL GALACTIC AMBUSH HIGHORIAL GALACTIC AMBUSH HIGHORIAL GALACTIC AMBUSH HIGHORIAL GALACTIC AMBUSH HIGHORIAL GALACOM DATA GHOST ATTACK-HO INLAT HICHORIAL GALACOM DATA GHOST ATTACK-HO INLAT HICHORIAL GOLF DRAGOM DOS DISK HICHORIAL GOLF DRAGOM DOS DISK HICHORIAL GUARBER HICHORIAL GRABBER DRAGOM DOS DISK HICHORIAL HYTEMBALACTIC FORCE HICHORIAL HYTEMBALACTIC FORCE HICHORIAL JUNIORS REVENOR HICHORIAL JUNIORS REVE	6.00	4 30 6 62 6 96 6 96 6 96 6 96 6 96 6 96 6 96
ICRODEAL MANSION ADVENTURE 1 \$ 32K	4 - 95 8 - 95 8 - 95 4 - 95 8 - 95	6.96 4.30 4.30
IGRODEAL MODULE MAN DISK UPGRADE DRAGON DOS IGRODEAL/DRAGON DATA MOOM HOPPEN S 32% IGRODEAL MOROCCO GRAND PRIX	8.00 3.00 4.95	4.30 4.30 6.96 2.63 COMIÃO BUON 4.30

	1	
NICRODEAL NR DIG DRACON POST OVER	(INC VAT)	P.RETAIL (EX VAT)
MICRODEAL MR DIO DRAGOM DOS DISK MICRODEAL MR DIO PREMIER DOS DISK MICRODEAL MUDFIES MICRODEAL PROGRAM PACK 1 MICRODEAL PROGRAM PACK 1 MICRODEAL PROGRAM PACK 2 MICRODEAL PROGRAM PACK 2 MICRODEAL PROGRAM PACK 4 MICRODEAL PROGRAM PACK 4 MICRODEAL PROGRAM PACK 4 MICRODEAL PROGRAM PACK 5	9.95 9.95 8.95 1.99 1.99	8.65 6.96 6.96 1.75 1.75 1.75 1.75 1.75 1.75 1.75 1.75
NICHODEAL PROGRAM PACK 5 NICHODEAL PRINGON PRINGIES DOS DISK NICHODEAL PENGON PRINGIES DOS DISK NICHODEAL PENGON PRINGIES DOS DISK NICHODEAL PINBALL NICHODEAL SCAPE BALL NICHODEAL SCAPEBALI NICHODEAL SCAPEBALI	0.95 4.95 4.95 4.95	6.04 COMING BUXIN 4.30 4.30 4.30 0.86
RICHOLERAL/D DATA MAIL RUMMER-WO INLAY \$ 16K RICHOLERAL SCARPHOLTA SHARK TREASURE \$ 16K RICHOLERAL SHOCKTHOOPER MARK TREASURE \$ 37K MICHOLERAL SHOCKTHOOPER DISK UPGRADE DRAG/DOS MICHOLERAL SPACE SHUTTLE RICHOLERAL SPACE SHUTTLE	8.00	0.86 4.30 4.30 4.30 7.61 COMING SOON 6.96 4.30 0.86
TICHOURAL JACKE BALL RUNNER-HO INLAY \$ 16K HICRODRAL JORGON DATA SHARE THEASURE \$ 16K HICRODRAL JORGON DATA SHARE THEASURE \$ 16K HICRODRAL JORGON DATA SHARE THEASURE \$ 16K HICRODRAL SHOCKTHOOPER DISK UPGRADE DRAG/DOS HICRODRAL SHOCKTHOOPER DISK UPGRADE DRAG/DOS HICRODRAL SHARMBLE WHITER HICRODRAL SHARMBLE WHITER HICRODRAL SHARMBLE HORDOLT MICRODRAL SPACE HONOPOLT MICRODRAL SPACE HONOPOLT MICRODRAL SPACE WAR HICRODRAL SPACE WAR HICRODRAL SPACE WAR HICRODRAL SPACE WARE DISK UPGRADE DRAUGH DOS HICRODRAL SPEED RACKER DRAGON DOS DISK # 37K HICRODRAL STAR SPORES HICRODRAL STAR SPORES HICRODRAL STAR SPORES HICRODRAL STAR SPORES	8 .00 9 .95 0 .99 8 .00 9 .95 9 .95	1.00 1.00
HIGROMEAL SPREED RACER PREMIER DOS DISK HIGROMEALJOLD AND SPORES HIGROMEALS STATES HIGROMEAL THE DARK PIT HIGROMEAL THE RANDIT HIGROMEAL THE RANDIT HIGROMEAL THE TOUGHTOME HIGROMEAL HIGROMEALD HIGROMEAL HIGROMEALD HIGROMEAL HIGROMEALD HIGROMEAL HIGROMEALD HIGROMEAL HORLD OF PLIGHT DRAGON DOS DISK HIGROMEAL WORLD OF PLIGHT DRAGON DOS DISK POCKET HOMET SOFTMARE MINBLEBUSTER FOCKET HOMET SOFTMARE DATAFALL FOCKET HOMET SOFTMARE PARALESS PAREDT FOCKET HOMET SOFTMARE THANKS FOCKET HOMET SOFTMARE THANKS FOCKET HOMET SOFTMARE THANKS FOCKET HOMET SOFTMARE THANKS SALAMANDER SOFTMARE THANKS SALAMANDER SOFTMARE DRAGON TREK SALAMANDER SOFTMARE DRAGON TREK SALAMANDER SOFTMARE DRAGON TREK SALAMANDER PRAKETURISHES	00005999000555555900005555599999999999	4 30 4 30 6 96 0 56 6 76 *MOT FROGRAM* 2 66 COMING SOOM 4 30 6 96 *HOT FROGRAM* 2 61 COMING SOOM
HICRODEAL ULTIMATE ADVENTURE 3. MICRODEAL WILLIAMABERO ADVENTURE 3. MICRODEAL WORLD OF FLIGHT DRACKED OF 5 12K PICKET MOMEY BANDITO PROCEST MOMEY BANDITO PROCEST MOMEY BANDITO TO THE PROCEST MOMEY BANDITO THE PROCEST MOME BANDITO THE PROCEST MOMEY BANDITO THE PROCEST MOME BANDITO THE BANDITO TH	1.00 4.95 8.95 4.95 9.95 1.99	3.61 COMING SOOM 4.30 4.30 SPECIAL OPPER 8.65 1.73
POGRET MOMET SOFTWARE FRANCES PREDDY FOCKET MOMET AND MOTOR OF FOCKET MOMET MODEL SOOD FOCKET MOMET MODEL SOOD FOCKET MOMET MODELS SOOD FOCKET MOMET SOFTWARE THA TIME FOCKET MOMET SOFTWARE THAT TIME FOCKET MOMET SOFTWARE THAT TIME	1.99 1.99 1.99 1.99 1.99	4.30 8.65 1.73 1.73 1.73 1.73 1.73 1.73 1.73 1.73 1.73
SALAMANDER GRIGHLEWOOD INCIDENT SALAMANDER GRIGHLEWOOD INCIDENT SALAMANDER EVEREST SALAMANDER EVEREST SALAMANDER FARKLINS TORB SALAMANDER FARKLINS TORB SALAMANDER GARBES FACK 1 SALAMANDER GRID ROUMER SALAMANDER GRID ROUMER SALAMANDER GRID ROUMER SALAMANDER GRID ROUMER SALAMANDER GRID RESET SALAMANDER HIGHT FLIGHT SALAMANDER HIGHT FLIGHT SALAMANDER SIZER SALAMANDER SALAMANDER PACK 1-0815 WHMEN- LAKEREGUE-HIGHT FLIGHT-WINGS OF WAR SALAMANDER SUZER SEILL HANGMAN SALAMANDER SUZER SEILL HANGMAN SALAMANDER VINGS OF WARTS AND GROUSSES SALAMANDER VINGS OF JAVA STAR SALAMANDER SALAMANDER SALAMANDER JAVA SALAMANDER JAMANDER JAVA	1.99 1.95 1.95 1.95 1.95 1.95 1.95	1.73 2.60 SPECIAL OPPER 3.30 3.30 3.30 3.30 4.30 4.30
SALAMANDER LOST IN SPACE SALAMANDER HIGHT FLIGHT GALAMANDER SED PRESIES SALAMANDER SIZ FACE NORMAL REF £47.70 INCLUDES, GOLF-GAMES FACE 1-GRID MUNHER- SALAMANDER SET FLIGHT-WINDS OF WAR SALAMANDER SET FLIGHT-WINDS OF WAR	1.95 1.95 1.95 1.95 5.00	4.35 SPECIAL OPPER
SALAMANDER DAN DIAMOND TRILOOT M.S.P.629.85 ALAMANDER VUICAM NOHOHTE AND GROWSEMS JALAMANDER VINGS OF WAR JAMANDE SFECIAL POUR PACK-MORMAL R.S.P.629.80 MONSTER MATHELITATION DIAMY-FARILY PROGRAMS— MONSTER MATHELY OF JAVA STAN A STAN JAMANDE RISTERY OF JAVA STAN	12.95 1.95 1.95 1.95 1.95 1.95	11.26 SPECIAL OFFER 1.30 1.30 3.04 SPECIAL OFFER
"BIARDS PETTIOREUS DIANT SPECTRAL ICE CASTLES "BOFTMARE PROJECTS DE SET WILLY "BOFTMARE PROJECTS DAIT MINER TOM HIX SUITAND BAIT TOM HIX CUBER TOM HIX CUBER TOM HIX CUBER	7.95 7.95 8.00 6.00 8.00 8.00	6.91 6.93 6.96 9.20 SPECIAL OPPER 9.20 SPECIAL OPPER 9.20 SPECIAL OPPER 9.10 9.10 9.10 9.10 9.10 9.10 9.10 9.10
TOM HIE ELECTRON TOM HIE KATERFILLA II "WINTERSOFT JUZZAPOSIZIOM (BARROMS OF SETI V) "WINTERSOFT RETURN OF THE RING "WINTERSOFT REGION OF SERVING PROPERTY OF SERVING	4.95 4.95 6.20 9.95 9.95	4.30 5.55 8.65 8.65
SEE ALSO UNDER DRAGON LINES MICRODEAL PLIPPER 16K	8.00 8.00 8.00	6.96 6.96 6.96
MICRODEAL ME DIG DISK 32K	9.95	6.96 6.96 8.65 6.96 6.96 6.96 6.96 6.96 7.17
SALAMANDER EVERENT TOMB SALAMANDER PRANKLINS TOMB SALAMANDER PRANKLINS TOMB SALAMANDER SANES COMPENDIUM SALAMANDER SANES SALAMANDER SANES SALAMANDER SOLD FRIS SALAMANDER SUPER SETLE HANDMAN SEK SALAMANDER SUPER SETLE HANDMAN SEK SALAMANDER SUPER SETLE HANDMAN SEK SEKCTMAL COLOR SANES SECTMAL COLOR SANES SA	8897787777777777777777771881158668950909090909090909090909090909090909090	6.04 6.91 6.91 6.91 7.01 7.01
*SPECTRAL ALPHA SEARCH *SPECTRAL COLON BAP *SPECTRAL COLUMNOUT *SPECTRAL CHOID SUPER BOWL *SPECTRAL CHOID SUPER BOWL *SPECTRAL CHOID *SPECTRAL CHOID *SPECTRAL CHOID *SPECTRAL CHOID *SPECTRAL CHOID *SPECTRAL CHOID *SPECTRAL CHOIR *SPECTRAL	8.00 8.00 11.50 10.00 6.95	5 70 DOLD WIEN GOS 6 76 30LD WIEN GOS 6 76 30LD WIEN GOS 6 76 70 MEN GOS 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
SPECTRAL COSMIC SUPER BOWL SPECTRAL CHOID SPECTRAL CHOICE SPECTRAL CHOICE SPECTRAL DEFENSE SPECTRAL DEFENSE SPECTRAL DEFENSE SPECTRAL DEFENSE SPECTRAL LAMER SPECTRAL LAMER SPECTRAL LAMER SPECTRAL LAMER SPECTRAL LUMAR SUPER PATROL SPECTRAL CHARS LABSRITH SPECTRAL CHARS LABSRITH SPECTRAL CHARS COMMENT SPECTRAL CHARS COMMENT SPECTRAL OFFICE DISK SPECTRAL OFFICE SPECTRAL SPECTRAL OFFICE SPECTRAL SPECTRAL FIGHTHELD	16.95 16.95 8.00 16.95 8.50 8.00 16.95	14.74 BOLD WHEN GOS 14.74 BOLD WHEN GOS 6.96 BOLD WHEN GOS 14.74 BOLD WHEN GOS 7.19 BOLD WHEN GOS 6.96 BOLD WHEN GOS 14.74 BOLD WHEN GOS
*SPECTRAL MS GOMMLER *SPECTRAL ORACLE DISK *SPECTRAL OFFICEAD *SPECTRAL OFFICEAD *SPECTRAL SPACE RAGE *SPECTRAL SPACE RAGE *SPECTRAL SPACE RAGE *SPECTRAL SPACE SEMTRY	16.95 23.00 11.50 8.00 8.00 16.95 11.50	8.70 SOLD WEEN GOB- 14.74 SOLD WHEN GOB- 20.00 SOLD WHEN GOB- 6.96 SOLD WHEN GOB- 6.96 SOLD WHEN GOB- 4.74 SOLD WHEN GOB- 4.74 SOLD WHEN GOB- 0.00 SOLD WHEN GOB- 0.00 SOLD WHEN GOB- 0.00 SOLD WHEN GOB- 0.00 SOLD WHEN GOB-
SPECTRAL OFFICE OF SPECTRAL OFFICE OF SPECTRAL OFFICE OF SPECTRAL FIGHTICS SPECTRAL FIGHTICS SPECTRAL FIGHT OF SPECTRAL FIGHT OF SPECTRAL FIGHT OF SPECTRAL SPACE TADDERS SPECTRAL SPACE TADDERS SPECTRAL SPACE WAR OF SPECTRAL SPACE WAS SPACE WAS SPECTRAL SP		
CUTHERT PRODUCTS BLANK CIP CUTHERT PRODUCTS BLANK CIP CUTHERT PARTON COMPUTER TAPES ***ICKNOWN C	0.40 0.43 0.43 0.43 0.43 0.43 0.43 0.43	0 - 35 0 - 37 0 - 39 0 - 39 0 - 39 0 - 39 1 - 04 1 - 04 1 - 04 1 - 26 1 - 36

TO ORDER

use our 24 hour service

By phone with credit card
By post to 0726 68020
41 Truro Rd, St. Austell,
Cornwall PL25 5JE



UK purchaser must use prices from column 1 and add **75p** P & P Non UK purchaser must use prices from column 2 and add **£2.** P & P. BFPO/Channel Islands/IOM/Southern Ireland, must use column 2 and

NAME	TYPE OF COMPUTER	add 75p P & P
ADDRESS	POST CODE	£
PLEASE SUPPLY		£
		£
		£
		£
	POST & PACKING	1
	TOTAL ENGLOSED	2

ICIAL ECLIPSE

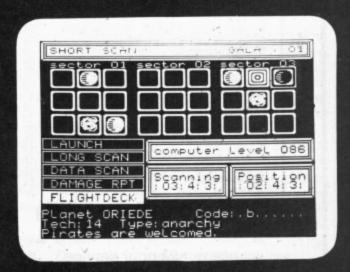
What will

THE ELITE OF DRAGON GAMES

- * Embark on a voyage of adventure through time and space in your quest to solve the mystery of the lost shards.
- Encounter the risks and perils of intergalactic trading, evading pirates and dodging customs officials to become the greatest wheeler-dealer in the universe.

GAME FEATURES

- * 3D Universe
- * 12 Galaxies
- * 120 Sectors
- * 720 Worlds
- * 1 Prophet (Yes, only 1, SORRY!)
- * High resolution graphics
- * Written in 100% machine code
- * Played entirely on PMODE 4 Screen
- * Arcade action pirate attacks



TOTAL ECLIPSE... simply light years ahead of any other DRAGON game



FREE UNIVERSE with every game

ECLIPSE-FENMAR LTD. Suite 10, 4 Orphanage Road, Birmingham, B24 9HS. Tel: 021 236 1130.

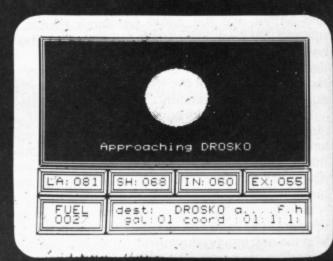
will you be doing this weekend....

EXTRACT FROM COMMANDER'S LOG.

SATURDAY 26:16:28:04

A.M. ON COURSE FOR PLANET DROSKO-LATEST REPORTS SUCCEST CIVIL WAR IN PROCRESS. GOOD OPPORTUNITY TO OFF LOAD OUR CARGO OF ARMS AND SUPPLIES. REPEATED PIRATE ATTACKS! ENGINEERING OFFICER REPORTS SEVERE DAMAGE TO SHIP. MUST FIND REPAIR CENTRE SOONEST

P.M. APPROACHING PLANET DROSKO.
SOLD ARMS FOR A GOOD PRICE. EQUIPPED
SHIP WITH OIL DRILLING GEAR WITH PROFITS
FROM ARMS SALE.
NAVIGATIONAL OFFICER REPORTS NEAREST
ASTEROID BELT IN SECTOR 3. SET COURSE
FOR SECTOR 3 TO BEGIN ASTEROIL DRILLING
SOONEST.
WILL STOP OFF AT ORIEDE FOR MEDICAL
SUPPLIES AND SHIP REPAIRS.



This game is NOT available for SPECTRUM
COMMODORE
AMSTRAD
MSX
and is NOT obtainable from WOOLWORTHS
BOOTS
WH SMITH
MOTHERCARE

ORDER NOW!

£9.95

INC.P&P

PLEASE RUSH MEcopies	of TOTAL ECLIPSE. I enclose cheque/PO for £	to cover
NAME:	TELEPHONE:	
ADDRESS:		the a Vertical

send to: ECLIPSE-FENMAR LTD. Suite 10, 4 Orphanage Road, Birmingham, B24 9HS. Tel: 021 236 1130.

Magic Mazes

Program: The Sword and the Sorcerer, Blaby Software, Crossways House, Lutterworth Road, Blaby, Leicester. Price £3.99

WHEN a few years ago I started playing *Dungeons and Dragons* I was sure that it was an experience that would make a great computer game. But as I progressed further and further into the game I realised that it would be practically impossible to write unless it was reduced to simple terms, such as collct the treasure, and kill the monsters.

Having reached this conclusion I dropped all desire to write such a game as I thought that it would have very little ability to hold the player's interest

Sadly, Blaby Software appears to have disagreed with me and has produced this rather simple game. The idea of the game is to wander around the maze (255 locations), collecting the three pieces of the key and then finding the locked door and escaping. To hinder your progression in this cause there are a seemingly unending string of monsters waiting in the various rooms.

The screen display is in mode 4 screen 1, and is very well done. A small frame to the left of the screen shows the view ahead of you complete with monsters, weapons, and whatever else happens to be in the room (ie food).

Two smaller frames to the right show your attack and defence weapons as icons and beneath these frames there is a list of the available options (the game is played entirely by single key choice from lists - good news for those who hate working out the appropriate words in an adventure). A very terse description of the monster in the room (such as There is a Unicorn here) is printed underneath the main frame (no pun intended) together with reports of your strength when appropriate and other lists of options.

Movement is via the arrow keys and leaves the display very confused as, if the left arrow is pressed, the player will turn to the left and then move one space, but, if there is no door on the left wall, the player will neither move nor turn. Get it? As you can imagine this makes mapping a necessity, but also, as a side effect, extremely difficult.

As you start at a different point in the maze every game using old maps becomes more trouble than making a new one! This is all very tiresome

The major fault with the game though is that it is very boring. There is no real strategy and, most importantly, no option to "be ingenious" — surely one of the most satisfying parts of playing role playing games.

This program bears an astounding similarity to *Star Swoop*: it's pretty and well-written but has no sustained challenge. However, as an introduction to *D & D* for the masochist, it may fill a gap!

Jason Orbaum



In the dark

Software: The Dark Pit, Microdeal, 41 Truro Road, St Austell, Cornwall

Price: £8.00

A CONVERSION from the Tandy, The Dark Pit will in fact work with the Tandy Electronic book plugged into the left joystick port, should you have such an item. Failing that, a common or garden joystick will suffice. The game itself is on the fairly familiar maze-like lines of Touchstone or Microdeal's QL and Commodore game, Lands of Havoc.

It will come as a surprise to no-one that the aim of the game is to escape from the dark pit itself, this comprising a number of linked rooms, each one taking up about three quarters of the screen area, with exits round the borders to other rooms. The joystick controls the inevitable little man, who runs quite gamely around, dodging the equally inevitable monsters and collecting anything he can lay his hands on. These objects are shown at the foot of the screen, and can be brought into play by pressing the 1-6 keys, the items being the likes of shotgun, shield etc., and there are also power packs to operate these.

Also lying around are red, yellow and blue keys, and astonishingly enough these open doors of a matching colour, giving you access to new areas of the maze, and as you collect objects, naturally your score increases. There are several keys of each colour, and you can accumulate these and use them one at a time as required.

Playing the game involves moving the man round the walls and barriers on each screen, avoiding the patrolling monsters and trying to reach as many of the assorted goodies as you can.

Most of the monsters move in regular patterns, and so there's plenty of bobbing and weaving and watching goes on, but there's also an element of *Manic Miner* type strategy in working out how you reach the objects and exits. Other monsters will insist on messing things up by sensing your presence, though.

As such the game is smoothly done and is quite fun to play, but it's rather old hat and merely combines elements of other games we've all seen before, going back to Berzerk.

It also has to be said that the collision detection is appalling, and it's far too easy to lose a life with space between you and a monster.

The screens get tougher as you go, with plenty of variety in them, so if you buy it you'll probably get your money's worth playing it, but it's nothing to get wildly excited about.

Mike Gerrard

Music Micro!

Program: Music Master, Golden Key Software, Industrial Estate, Dunkeswell, Devon. Price: £8.95 (tape), £9.95 (disk).

MUSIC MASTER is a utility designed to help you write and edit a tune displayed in hi-res in standard musical notation. All options are selected from the keyboard, and as there are 34 possible functions, things are rather confusing to start off with.

This is not helped by the manual which contains numerous printing errors in the table that tells you which keys to press to play each tone.

After a little experimentation, the key layout becomes familiar, and entering a tune becomes a lot easier. It is then that the shortcomings of the program are revealed.

For a start, the program uses the play command and so only one note can be played at a time. This seriously limits the usefulness of the program — it does not have much educational value, and frankly it does not expand the Dragon's music potential at all for the programmer.

For the musician, several things about this program make it irritating to use.

Firstly, no sharps of flats symbols that raise or lower the pitch of a note) are displayed on the stave; bar lines cannot be displayed, and there is no facility to dump the music to a printer — a feature that might have made this program worthwhile.

To give the author his due, the program is very professional, and it does everything the manual says it does, but it is a pity that a little more thought had not gone into the program at the design stage.

David Rowntree





NEW ONLY £7.95

DRAGON DRAW

This superb lightpen-driven drawing program allows the DRAGON's hi-res graphics commands to be used directly from the on-screen menu shown here. There are a wealth of commands available and the lightpen response is virtually instantaneous.

- * 4 pen sizes
- ★ Dotted lines, adjustable spacing
- * Shape linked brush
- * 2 drawing screens
- ★ Solid and empty boxes
- * Polygons
- * Freehand sketch
- * Solid and shaded fill
- ★ Printer/Plotter dump
- * Save and Load
- * Get and Put from different screens





SKETCH

- ★ PMODE 4 with 2-colour drawing
- ★ PMODE 1 with 4-colour drawing
- * On screen menu
- * Circles, Lines, Colour Fill
- ★ Erase and adjustable locked grid for accurate drawing

SHAPE

- ★ PMODE 4
- ★ On screen menu
- ★ Design shapes on enlarged scale
- ★ Construct shape libraries
- ★ Plot shapes
- * Rotate, Join, Fill
- ★ Use pictures in SKETCH or DRAGON-DRAW

PLUS details for use in your own programs

ALL FOR ONLY £25.00 inc. VAT and Postage



Available from: DEPT. DU

Datapen Microtechnology Ltd., Kingsclere Road, Overton, Hants RG25 3JB

 \Box

|SHAPE | DRAW | PAINT | COLOUR

.

SCREEN

£ + □

PLOT

PLOT

SKETCH

SKETCH

EXIT

(EXIT

Tel: (0256) 770488

SHOW-JUMP





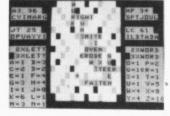
Exclusively written for the Dragon 32/64

- ★ Exercise your riding skill in the show-jumping arena!
- * Full Colour, High Resolution "Arcade-Action" Graphics
- * Any number of riders may compete
- ★ Nine different courses of varying difficulty
- ★ Wide range of fence styles including walls, water jumps, etc.
- ★ Jump-off against the clock

£6.50

SAME DAY DESPATCH!!

TRADE ENQUIRIES WELCOME

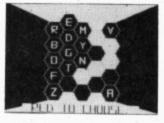


£5.50

LINKWORD

The game is for 2 to 4 players, the object being to score points by forming words on the board using only the letters randomly provided in your personalised rack. The computer automatically calculates all scores, for both direct and indirect word formations, including double and triple word scores, 50 bonus etc. Full cursor control is provided so that letters may be easily placed anywhere on the board. The game features bright, colourful graphics with facilities for correcting mistaken spelling or exchanging difficult letters.

"Linkword seems to be an excellent program, with much enjoyment to be had from it . . ." — Dragon User, May '85



BLOCKBUSTER QUIZ

All the fun of the TV game adapted for 2 players. The game contains 500 questions covering a wide range of topics and varying in difficulty from easy to hard. Colourful high resolution graphics are used to display the board from which a player makes his letter choices and plots his winning path!

€5.50

"Computerware present the quiz in an efficient and compelling way" — Dragon User, May '85

All prices include postage. Cheques, POs payable to:

COMPUTERWARE

PO Box 318, Stoke-on-Trent, ST6 6UX



WHERE WOULD we be without Scott Adams? In looking at his series of adventures, all converted for the Dragon fairly recently, I've still only reached Secret Mission, which dates from 1979 and is said to be of an advanced level of difficulty, though I wouldn't let that put anyone off. The messy opening screen is enough to put you off before you've started, though, and I wish someone could have at least taken a little trouble to tidy it up. It reads as follows: "I am in a b riefing room. Visible items: large tape recorder. Some obvious exits are: west. Welcome to Adventure Number 3 Secret Mission by Scott Adams. Dedicated to Maegen Adams. A minute ago someone ran out of this room! By the way, I seem to be carrying something! What shall I do?" My answer is that you put the title and dedication at the beginning, not half-way through your first location, and it might also help if the cassette cover agreed this was adventure number three instead of calling it number four. Nit-picking? Well, if a reader sent me in an adventure for evaluation and it looked like this I'd tell them to sort it out, so I don't see why Scott Adams should get away with it!

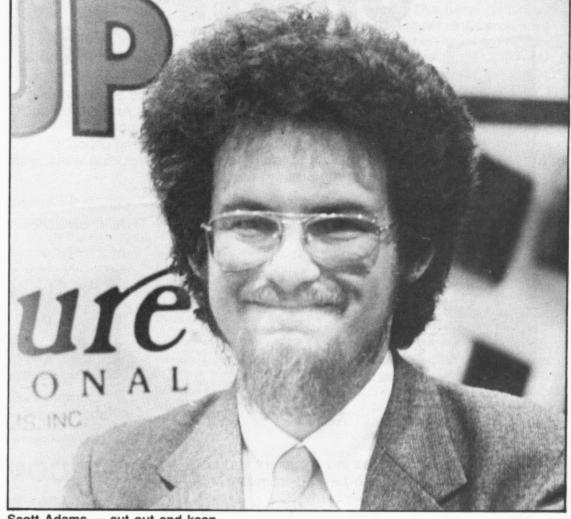
Initially there's not much of a story to go on, but if you listen to the tape recorders you learn that you're in a nuclear reactor plant and that a saboteur is at loose. Armed with a time-bomb, the saboteur is prepared to kill himself in order to destroy the plant. and guess whose job it is to stop him? Got it in one. Amazing the messages that get left on tape recorders, isn't it? You're also told that you'll find security keys and a map in the manila envelope beside the tape recorder, but after a frustrating time typing GET ENVELOPE, GET MANILA, GET MANILA ENVELOPE, MOVE RECORDER etc, I eventually realised that the envelope must have been nicked by the figure that ran out of the room a minute ago. In which case why didn't he take the incriminating tape recorder, too, which he does later on if you leave it lying around? Perhaps you disturbed him in time, so we'll give him the benefit of the doubt on this one, but credibility is not this adventure's strongest point. Considering that you're trying to save the plant from destruction, it's amazing how hard everyone there makes this for you.

Still, ours is not to reason why, the adventurer must do or die, and you're helped to do it by having a surgically implanted bomb detector on you (or in you)

which thankfully is currently glowing green, informing you that the bomb is safe. A little exploration leads to a few twisting corridors and locked doors, with nothing much lying around except for an empty plastic pail in a maintenance room. This object pales into insignificance, however, when you reach the grey room and discover a box with apparatus pointed at a chair which is bolted to the floor. You're told that it seems quite safe and you're invited to sit down. No thank you! Well, not straight away, though you pretty soon discover that in fact this is your only option (unless you can come up with a more imaginative use of a bucket than I could).

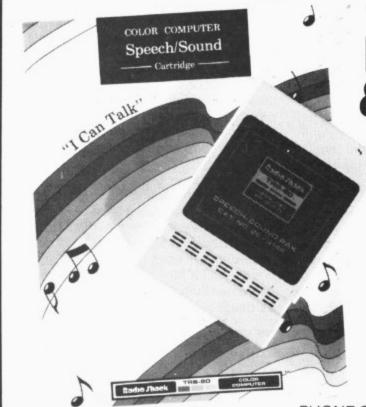
I won't tell you what happens in the chair, though I will tell you that there seemed to be a slight bug in the program which wouldn't let me enter any commands once I stood up again, only coming back each time with the response "Use no more than two words." I couldn't even QUIT, but this didn't happen a second time so maybe it was just a glitch.

After a while you hear a thud somewhere in the building, and as you rush to investigate you fall over one dead saboteur. He's positively overflowing with objects, like a piece of yarn, an empty envelope, an empty pill case and more, and as well as getting all these you can even get the dead saboteur. Wandering round with a dead body hanging round your neck, you should be able to get through the white door into a large white visitor's room, and while I don't want to give too much away I find the next little hurdle an even more improbable part of the story. The saboteur had an identity card on him, which has to be inspected, but without the body you won't be able to proceed as the picture on the card doesn't match your own face. However, it you happen to have with you the dead saboteur then everyuthing's fine, as the face on the card matches the face on the dead body. Charming! Mind you, if the picture on the card is anything like most passport photos, the only face it would resemble is a dead one.



Scott Adams - cut out and keep.

TRS 80 SPEECH SOU



Works with

DRAGON 32/64 & TANDY COLOUR This great

addition to your computer "Speaks for Itself"

★ Generate complex sound effects

★ Play 9 octaves of music on 3 independent channels

★ Integrate speech & sound effects

★ ROM-PAC contains 4k ROM plus 2k RAM to store routines

★ Comprehensive 64 page manual

★ Sample programs included in manual

★ Incorporate professional speech/sounds in your own programs without large memory overheads

Technical information included

41 TRURO RD., ST. AUSTELL, CORNWALL PL25 5JE

PHONE CREDIT CARD ORDERS 0726 68020



RADIO SHACK PRINTERS for DRAGON Tandy Now available from MICRODEAL



■ High Performance For Less! ■ Bit-Image Mode For Graphics ■ 80 Characters Per Second ■ Prints 9 x 8 Dot-Matrix Characters on an 8" Line

DMP 105 (Order No 26 -1276)

Our lowest price ever for a full-size, 9" dot-matrix printer! Print quality rivals printers at twice its price. Low-cost complement to your Colour Computer or Model 4/111. Prints 10, 12 and 16.7 characters per inch. Features elongated and condensed type, underline and boldface. Graphics mode allows 480-800 dots per line. Uses fanfold paper or single sheets. Includes parallel and Colour Computer-compatible serial (600/2400 baud) interfaces. FREE Cassette version of telewriter and printer cable with this printer

Replacement Ribbons (Order No 26-1288) £5.75

■ Prints Over 200 Words per Minute ■ Clean, Sharp Characters For That "Electric Typewriter Look" ■ Uses Interchangeable 100-Character Print Wheels

DWP 220 (Order No 26 - 1278)

Letter-perfect printing for word processing programs like SCRIPSIT. Select 10 or 12 cpi, or proportional pitch. Print wheel cassettes simply "drop in" for clean, easy installation. Prints at 20 cps. Includes forward and reverse paper feed, 1/2-line feed, underline and programmable back-space. "Paper empty" and "ribbon end" sensors. Automatic impact control prolongs print wheel life. With Courier 10 print wheel, carbon FREE Cassette version of telewriter and printer cable with this printer

Optional Tractor Feed Attachment £110 (Order No 26 - 1444)

SUPERB PRINT QUALITY

DAISY WHEEL PRINTER £500



LOW PRICE THERMAL PRINTER £69.95

(Order No 26 - 1261)

TP-10 prints alphanumerics and block graphics with your Dragon computer. Uses thermal paper only. FREE Printer cable with this printer

41/3" wide thermal paper, 2 rolls £3.49 (Order No 26 - 1332)

Post & Packing free on printers 75p on other items



ORDER BY POST TO: 41 Truro Road, St. Austell Cornwall PL25 5JE

BY PHONE WITH CREDIT CARD O726 68020 From here the adventure hinges on getting a correct sequence of events, and also working out the order in which you must press various coloured buttons in order to make things happen or stop them happening. From what I've seen so far, I wouldn't have thought this was notably harder than others in the series, where you sometimes even have difficulty starting, but maybe it gets tougher. Certainly worth investigating, anyway, but I'd try other Adams aventures first.

One of his other titles, of course, is *The Hulk*, and regular reader Philip Blazdell of 93 Jail Lane, Biggin Hill, Kent TN16 3SE is merrily collecting stars in this one but doesn't know where to store them. For that you: *EMREP TSAC*. Philip also says he can't throw bricks high enough to reach . . . something which I couldn't make out in his letter. If you can guess what it is and can help then contact Philip, who in return offers help on most of the Adventure International series.

No doubt the ears of many readers will prick up when they hear that help is available on Syzygy, from Bet Hall of 37 Caxton Close, Hartley, Dartford, Kent DA3 7DG. There must be something in the Kent air, as Bet, like Philip Blazdell, has completed a vast number of adventures. Her advice on Syzygy will have to be printed forwards as it's quite long, but because so many of you have written in to ask how to kill the Darth Vader figure I don't imagine you'll mind. Bet says you have to release the fuzzy to kill the huge alien in order to get the light sabre. Then you can go back to the computer to release Darth Vader for a practice battle, but by plunging in at the deep end and going for him straight away Bet managed to kill the Dark Lord at the third attempt. Just to prove it wasn't a fluke, though, she went back and did it another five times. She warns that you haven't seen the last of him, however, but if anyone's really stuck at the first hurdle then send Bet a tape with a saved game on and she'll progress it through for you. Don't forget to also send a jiffy bag with sufficient postage for Bet to return the tape to you, otherwise she has my express permission to ignore you, so there.

Philip Dooley of Cheshire starts his letter by saying that I've got a lot to answer for. What can this be? An incorrect clue, or recommending a duff adventure? No. it's just that about 12 months ago Philip was quite happy enough playing Donkey Kong, Chuckie Egg and others, but then he started reading the adventure column and thought he'd give them a try. Since then, total addiction, many sleepless nights and a distinct cash problem, not to mention woman trouble in Shenanigans and Sea Quest. I've sorted out Philip's woman trouble for him, but can't do much about the addiction, I'm afraid. Perhaps this column should just carry a government health warning, that reading it can seriously damage your sanity.

That must be what's happened to Dave Halliwell of Birkenhead, who wrote to say he's having trouble with that well-known adventure, *The Clog-Dancing Shepherds of Milton Keynes*. Dave says he's managed to get the long-life milk from the concrete cows, and has made some cement with it, but doesn't know what to do with the

cement or how to get rid of the town full of Zombies. He says he's also found the photo of Mrs Thatcher but can't locate the matches or sickness tablets. This column being politically neutral, I can't say whether he's on the right lines with that last one. But thanks to Dave for a letter which was certainly different and gave me quite a laugh.

Always end on a good note, they say, so for all of you who have written over the past few months to ask if we'll ever see a version of the infamous Colossal Cave Adventure on tape for the Dragon, apart from the disk version from Compusense, well, good news could be on the way. A machine code version, only slightly abbreviated, has been produced by a company called Cowen Software from Manchester, using their own machine code adventure writing utility. At the moment the company's trying to see if one of the larger Dragon software houses will publish it, but failing that then they'll do it themselves, and having seen a preliminary version of the game I'm sure it will appeal to lots of Dragon adventurers. I won't be reviewing it till I can tell you where you can buy it, and for how much, but if you're at all interested then there's only one thing to do, as usual . . . watch this space.

Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Help-

line, 12/13 Little Newport Stret, London WC2H 7PP. As soon as enough entries have arrived, we will start printing them in the magazine.

Don't worry — you'll still have Adventure Trail to write to as well!

Adventure	
Problem	
Name	
Address	
	Jan 86

Adventure Contact

Adventure: Pettigrews Diary
— London Frolics. Problem:
How do you get to meet someone in the hotel? And where's the code for Island Hut?
Name: Rikkie Proost.
Address: 19 Tregoning Street Linksfield, Johannesburg, 2192, South Africa.

Adventure: Return of the Ring. Problem: I am at Level 16 with 60000 experience and have completed all quests, I even have the Time Ring but what do I do next? Help! Name: Rafe Rainbird. Address: Room 201, Agnes Westons, Albert Road, Devonport, Plymouth, Devon.

Adventure: Return of the Ring. Problem: How do I get the genie and glass? What is

the use of the Glass? Name: David Eggleden: Address: 9 Tithe Road, Chatteris, Cambs, PE16 6SL.

Adventure: Madness and the Minotaur. Problem: How do I get the torch and can I have the hint sheet please? Name: David Gill. Address: 11 Aldersleigh Drive, Wildwood, Stafford, ST17 4RY.

Adventure: Return of the Ring. Problem: Walked on Forest Moon but can't do anything that's useful — help! Name: David Hunt. Address: 16 Harfield Gardens, Grove Lane, Camberwell, London SE5 8DB.

Adventure: Shenanigans. Problem: How do you get out of the city at the start? I am

stumped. Name: Paul Houghton. Address: 5 The Parklands, Heaton Norris, Stockport, Cheshire, SK4 1QZ.

Adventure: Manic Miner. Problem: Mutant Telephones. Name: Guy Hunter. Address: 28 Lyon Street, Bognor Regis, West Sussex.

Adventure: Return of the Ring. Problem: In the House of Quests in the Forest, what is stone? How do you get the key from the genie? Name: Mark Hayward. Address: 5 Burden Close, Bodmin, Cornwall, PL31 1NY.

Adventure: Mansion of Doom. Problem: How do I get across the deep pool of acid that blocks my path to the coffin? Name: Marcus Browning. Address: 47 Oaks Drive, Higham Ferrers, Northants, NN9 8EX.

Adventure: Return of the Ring. Problem: Where is the Travel Unit? Can't find Gron. Will offer help on the Genie, Halm's Temple, Book of Skulls. Name: Paul Bryant. Address: 1 Claremont Villas, Tamworth Road, Furnace End, Birmingham, B46 2LG.

Adventure: El Diablero. Problem: How do you kill the Eagle? What do you with the Magic Bush? Name: S. J. Gamble. Address: 39 Plaistow Avenue, Hodge Hill, Birmingham, B36 8HQ.

JOHN PENN DISCOUNT SOFTWARE

FOR THE DRAGON

LATEST BIG REDUCTIONS

Tim Loves Cricket RRP £8.95 WAS £6.70 NOW ONLY £4.70 (Peaksoft) — also available in Tandy version Manic Miner RRP £7.95 WAS £6.35 NOW ONLY £4.00 (Software Projects)

BARGAIN BASEMENT

£1.50 each : five for £6.00 : ten for £10.00 Please give at least two alternative choices when ordering five or more programs. Death Cruise U.X.B.

Transylvanian Tower Movie Producer Poseidon Adventure Cells & Serpents Detective Demon Knight

White Barrows* Up Periscope Superspy Wizard War Dragon Trek

Dungeon Raid Golf Handicap Golf*

Pettigrew's Diary Lionheart Danger island

Drag Runner Night Flight Grid Runner

Mined Out Frogger Don't Panic

Ossie Death's Head Hole Cuthbert Goes Walkabout

Electron Defense

Mansion of Doom Final Countdown* Vulvan Noughts & Crosses

Games Compendium* Mansion Adventur I

Jerusalem Adventure II* Williamsburg Adventure III* Ultimate Adventure IV

Katerpillar II* Champions Escape Leggitt

EDUCATIONAL CORNER

TITLE Number Gulper* Number Puzzler Tiger Grand Prix* Circus Adventure School Maze Quiz Pack Fun to Learn Live and Learn*	PUBLISHER Dragon Data Dragon Data Tiger S/ware Dragon Data Dragon Data Shards Shards Shards	AGE RANGE 4-11 years 4-11 years 7-16+ 4-8 years 4-8 years all the family 8-12 years 8+	£7.95 £7.95 £3.99 £7.95 £7.95 £3.95 £3.95 £3.95	OUR PRICE £2.00 £1.50 £2.00 £1.50 £1.50 £1.50
---	---	--	--	--

Cheshire Cat series (Ampalsoft) R.R.P. £14.75 FURTHER REDUCTIONS TO: £3.50 each or two for £6.00

Maths Level I (4-6 years) (6-7 years) (part I only Maths Level II 'O' Level Maths Superspy (History: a spy simulation for 11 and upwards Basic Tutor Basic Tutor

Chuckie Egg (A&F Software) Hunchback (Ocean)

RRP £7.90 WAS £6.35 NOW ONLY £3.00

RRP £6.90 WAS £5.50 NOW ONLY £2.50

SPECIAL OFFERS

Games			OUR
TITLE	PUBLISHED	RRP	PRICE
SAS	Peaksoft	£6.95	£2.00
Photo-Finish	Peaksoft	£6.95	£2.00
Ket Trilogy	Incentive	£9.95	
Back Track	Incentive	£6.50	£7.50
Jet Set Willy	Software Projects	£7.95	£4.50
Ring of Darkness*	Wintersoft	£6.95	26.35
Return of the Ring	Wintersoft	£6.95	23.00
Football Manager	Addictive		£5.50
Buzzard Bait	Tom Mix	27.95	£5.95
Dragon Fly*	Hewson	£9.95	£4.00
Air Traffic Control	Microdeal	£6.95	£2.00
Cuthbert in the Cooler	Microdeal	00.83	£2.50
Cuthbert in the Mines*	Microdeal	00.83	€4.50
Eightball	Microdeal	00.83	£2.50
The King*	Microdeal	00.83	£2.50
Lost in Space	Salamander	00.83	£2.50
Franklin's Tomb	Salamander	£9.95	£2.50
Hungry Horace*	Melbourn	£9.95	£2.50
Chess		€5.95	23.00
Dominoes	Oasis	£5.95	£2.50
Invader Cube	Oasis	25.95	£2.50
Backgammon	Oasis	£5.95	£2.50
Othelio	Oasis	£5.95	£2.50
	Oasis	£5.95 .	£2.50
Mission I Project Volcano*	R&B Software	£7.95	£2.99

SPECIAL OFFERS

Utilities

NEW from Grosvenor Software: D.R.S. (Data Retrieval System) Cass. RRP £9.95 Our Price £8.00. Cart. RRP £18.00 Our Price £14.95.

BUBU IOUES			-
PUBLISHER	MEDIUM	RRP	OUR
Compusense	Cart.		29.50
Compusense			£11.50
Grosvenor			£19.95
Foulsham			25.00
Oasis			25.00
			£5.00
Dragon Data			£3.99
oragon baia	Cass.	1.7.95	£2.00
P.S.S.	Cass	67.05	£2.00
Logic 3			\$5.00
MST Business Software			00.83
			00.02
			26.00
			00.00
			00.83
			00.83
			00.83
			00.83
			00.83
			£19.95 £19.95
	Compusense Grosvenor Foulsham Oasis Oasis Salamander Dragon Data P.S.S.	Compusense Cart. Grosvenor Foulsham Cass. Oasis Cass. Cass. Logic 3 Cass. MST Business Software Disk MST Business Software Disk MST Business Software Disk MST Business Software Disk MST Business Software MST Business Software Disk Disk Disk Disk Disk Disk Disk Disk	Compusense Cart. £30.45 Compusense Cart. £34.50 Grosvenor Cart. £22.95 Foulsham Cass. £12.95 Oasis Cass. £14.95 Oasis Cass. £14.95 Salamander Cass. £9.95 Dragon Data Cass. £7.95 P.S.S. Cass. £12.95 MST Business Software Cass. £19.95 MST Business Software Cass. £19.95 MST Business Software Cass. £19.95 MST Business Software Disk £24.95 MST Professional Range Disk £24.95

HOW TO ORDER

Write to us quoting the title, publisher and price of the programs you want. Please include 50 pence for postage packaging on single orders and 75 pence for two or more titles ordered. Postage to rest of Europe is £1.50, and £3.00 to rest of world. If possible please give your telephone number as well as your full address. Cheques/postal orders made payable to John Penn discount Software.

All the software listed is subject to availability. Please allow up to 14 days for delivery. Trade Enquiries are welcomed.

Limited numbers only available.

JOHN PENN DISCOUNT SOFTWARE

Dean Farm Cottage, Kingsley, Boardon, Hants GU35 9NG Tel. Bordon (04203) 5970

heat Sheet!

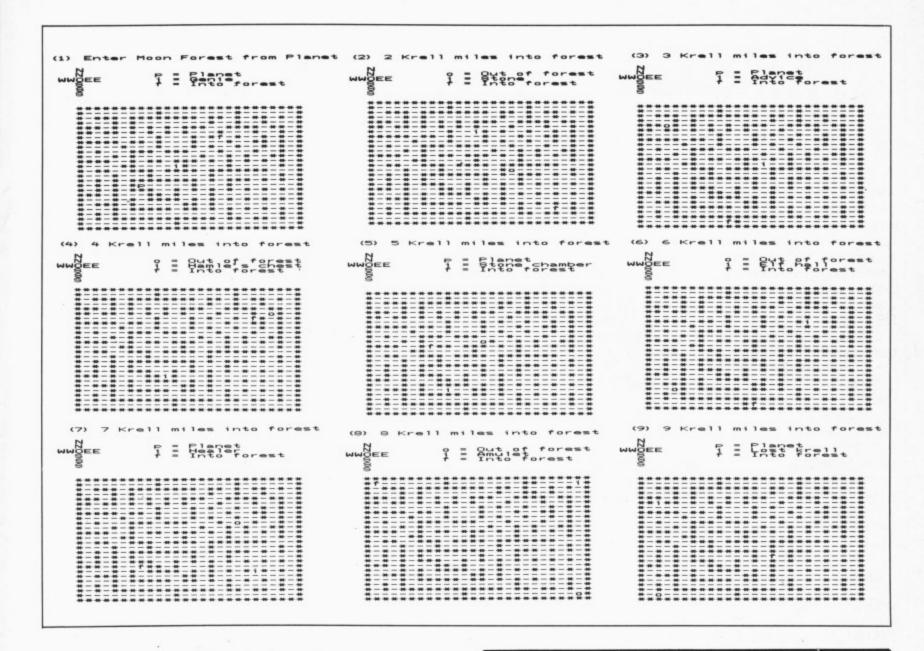
HAVING SPENT many frustrated hours nightmares. struggling to overcome the Powers of Darkness to be found in the Return of the of use to other Ring fanatics having similar transporters being different at each level. I

First the maps of the Moon forests: there are levels of forest, the "maze" pattern Ring, here is some information that may be being the same in each, the locations of the

have not indicated all of the benefits to be gained in the "Interesting Places", as I feel that this would spoil the spirit of the game for the true adventurer.

For the adventurer with less moral fibre, the "cheat" program modifies the "Save" tape to increase the player's status. Modification to the number of regenerations has been deliberately omitted, as anyone unable to make rapid progress with an infinite supply of credits, crystals, and food deserves to meet with an untimely end!

```
10 CLEAR200, 25672
20 DIM N# (9): N# (1) = "NAME": N# (2) = "STRENGTH": N# (3) = "CHARISMA": N# (4) = "INTELLIGENCE": N# (5) = "EXPERIENCE": N# (6) = "STAMINA": N# (7) = "CREDITS": N# (8) = "CRYSTALS": N# (9) = "FOOD
     30 CLS0:PRINT342, "cheat"; CHR$ (128); "program";
40 PRINT3111, "for";
50 PRINT3165, "the"; CHR$ (128); "return"; CHR$ (128); "of"; CHR$ (128); "the"; CHR$ (128); "
40 PRINTal11, "for";
50 PRINTal55, "the"; CHR$ (128); "return"; CHR$ (128); "of"; CHR$ (128); "the"; CHR$ (128); "ring";
60 PRINTal299, "robin"; CHR$ (128); "beard";
80 FOR T=1 TO 3000:NEXT
90 FOR T=1 TO 3000:NEXT
90 FOR T=1 TO 3000:NEXT
90 PRINTal39, "FOR LOADING"
110 PRINTal39, "FOR LOADING"
110 PRINTal39, "FOR LOADING"
110 PRINTal95, "PRESS ANY KEY WHEN READY":MOTORON
120 A$=INKEY$:IF A$<>" THEN MOTOROFF ELSE 120
130 CLS:PRINTal71, "PRESS 'PLAY'":PRINTal263, "THEN PRESS ANY KEY"
140 A$=INKEY$:IF A$<>" THEN CLOADM"X" ELSE 140
150 IF PEEK (110) =0 THEN SOUND 200, 1
160 CLS:PRINTal8, "YOUR STATUS IS:-"
170 PRINT:PRINT" 1 NAME: ";:FOR I=25684 TO 25698:PRINTCHR$ (PEEK (I));:NEXT
180 PRINT:PRINT" 2 STRENGTH: ";PEEK (25740)
190 PRINT" 3 CHARISMA: ";PEEK (25741)
200 PRINT" 4 INTELLIGENCE ";PEEK (25741)
210 PRINT" 5 EXPERIENCE: ";PEEK (25710) *256+PEEK (25711)
220 PRINT" 6 STAMINA: ";PEEK (25726) *256+PEEK (25727)
240 PRINT" 7 CREDITS ";PEEK (25726) *256+PEEK (25727)
240 PRINT" 9 FOOD: ";PEEK (25726) *256+PEEK (25727)
250 PRINT" 9 FOOD: ";PEEK (25720) *256+PEEK (25703)
260 PRINT" 10 SAVE NEW STATUS"
270 PRINT:PRINT" WHICH WOULD YOU LIKE TO CHANGE (ENTER NUMBER) ";:INPUT X:IF X<B
OR X>10 THEN CLS:PRINT" REPEAT":GOTO170
280 ON X GOTO 300,360,410,460,510,560,600,640,680,720
290 GOTO 170
300 GOSUB 800
   280 ON X GOTO 300,360,410,460,510,560,600,640,680,720
290 GOTO 170
300 GOSUB 800
310 PRINT" (NOT MORE THAN 15 LETTERS) ":FOR I=25684 TO 25698:POKE I,0:NEXT
320 INPUT NA$:IF LEN (NA$)>15 THEN PRINT" TOO MANY LETTERS":GOTO300
330 IF LEN (NA$)>15 THEN PRINT" TOO MANY LETTERS":GOTO300
340 FOR I=1 TO LEN (NA$):POKE25683+I,ASC (MID$ (NA$,I,I)):NEXT
350 GOSUB810:GOTO170
360 GOSUB800
370 PRINT" (10 TO 40) ":INPUT SG
380 IF SG<10 OR SG>40 THEN PRINT" MERONG ENTRY":SG=0:GOSUB820-GOTO170
     380 IF SG<10 OR SG>40 THEN PRINT" WRONG ENTRY": SG=0: GOSUB820: GOTO170
   380 IF SG<10 OR SG>40 THEN PRINT" WRONG ENTRY":SG=0:GOSUB820:GOTO170
390 POKE 25740,SG
400 GOSUB810:GOTO170
410 GOSUB800
420 PRINT" (10 TO 40) ":INPUT CH
430 IF CH<10 OR CH>40 THEN PRINT" WRONG ENTRY":CH=0:GOSUB820:GOTO170
440 POKE 25741,CH
450 GOSUB810:GOTO170
460 GOSUB800
470 PRINT" (10 TO 40) ":INPUT IN
480 IF IN<10 OR IN>40 THEN PRINT"WRONG ENTRY":IN=0:GOSUB820:GOTO170
490 POKE25742,IN
   488 OF IN-10 OR IN-40 THEN PRINT WRONG ENTRY": IN=0: GOSUB820: 490 POKE25742, IN 500 GOSUB810: GOTO170 510 GOSUB 800 520 PRINT" (60000 MAXIMUM) ": INPUT EX 530 IF EX>60000 THEN PRINT" TOO MUCH": EX=0: GOSUB820: GOTO170 540 POKE 25710, INT (EX/256): POKE 25711, EX-PEEK (25710) *256
     550 GOSUB810:GOTO170
     560 GOSUB800
    570 INPUT ST
580 POKE 25700, INT (ST/256): POKE25701, ST-PEEK (25700) *256
590 GOSUB810: GOTO170
     600 GOSUB800
   600 INPUT CT
620 POKE 25726, INT (CT/256) : POKE 25727, CT-PEEK (25726) *256
630 GOSUB 810: GOTO170
640 GOSUB800
650 INPUT CY
660 POKE 25736, INT (CY/256) : POKE25737, CY-PEEK (25736) *256
     670 GOSUB810:GOTO170
     690 GOSUB800
680 GOSUB800
690 INPUT FO
700 POKE25702, INT (FO/256):POKE25703, FO-PEEK (25702) *256
     710 GOSUB810:GOT0170
   710 GOSUB810:GOTO170
720 CLS:PRINTa68, "PREPARE YOUR 'SAVE'TAPE"
730 PRINTa140, "FOR SAVING"
740 PRINTa196, "PRESS ANY KEY WHEN READY":MOTORON
750 A$=INKEY$:IF A$<>"" THEN MOTOROFF ELSE 750
760 CLS:PRINTa133, "PRESS 'SAVE' & 'RECORD'
770 PRINTa199, "THEN PRESS ANY KEY"
780 A$=INKEY$:IF A$<>"" THEN CSAVEM"X", 25673, 29472, 25673 ELSE780
   790 END
800 CLS:PRINT" ENTER NEW "N# CO:RETURN
810 CLS:PRINT" YOUR NEW STATUS IS:-":RETURN
820 FOR T=1 TO 1000:NEXT:GOSUB810:RETURN
```



USEFUL SOFTWARE

FOR DRAGON 32/64/128 AND DRAGONDOS/CUMANA DOS 2.0

Professionally written programs for home, clubs, and small business, with random access disk filing and our 42 by 24 screen with true lower case.

£14.99 Personal accounts MONEYBOX

Controls income and expenses etc. Optional VAT analysis for use as small business cashbook.

Mailing list MAILBOX

£16.99

Stores names, addresses and up to 10 user-defined fields. Prints labels, letter-starts, reports, etc.

Stocks and shares £16.99

Prints or displays share valuations, capital gains, dividends and tax credits, income forecast, price changes, draws graphs of price trends.

SALESBOX Sales Ledger £19.99
Balance brought forward with cash allocated over 4 periods. Files can be

read by CASHBOX. **Purchase Ledger** BILLSBOX

Balance brought forward with cash allocated over 4 periods. Files can be read by CASHBOX. Nominal Ledger CASHBOX £19.99

Double entry accounting system. Prints trial balance, balance sheet, profit and loss, budgets, forecasts, audit trail. Reads sales/purchases.

NEW! STOCKBOX Stock control £19.99

Records orders, stock changes. Prints low stock list, orders outstanding, valuation, turnover, price list, stock movements. Bulk changes prices.

ORDERBOX Invoicing £16.99
Prints invoices etc, on plain or pre-printed paper. Can link to SALESBOX or STOCKBOX.

Cheques/POs/Further details/Dealer enquiries to:

HARRIS MICRO SOFTWARE

49 Alexandra Road, Hounslow, Middlesex TW3 4HP Tel: (01) 570 8335

SEASON'S GREETINGS

THE TOP TWENTY OF **EDUCATIONAL SOFTWARE**

FOR THE

DRAGON or TANDY COCO

- Physics O Level/CSE Biology O Level/CSE
- Computer Studies O Level/CSE
- 4. Maths CSE
- Arithmetic 7/10 yrs English 12/14 yrs
- English 8/11 yrs
- Science 12/14 yrs
- 9. Typing 9/99 yrs
- 10. Maths 8/11 yrs 11. Maths 12/14 yrs
- 12. Maths O Level
- 13. Chemistry O Level
- 14. Spelling 9/99 yrs 15. Tables 7/10 yrs
- 16. Reasoning 11+ 17. Sports quiz 9/99 yrs
- 18. Knowledge quiz 9/99 yrs
- Computer Studies 19.
- (set of 4)
- 20. Profile

Computerised filing system

£4.95 each

(Nos 1 to 18) (No 19 £14.50 No 20 £9.95)

Cheques/POs to

MICRO DE-BUG CONSULTANCY

DEPT DU 60 SIR JOHNS ROAD SELLY PARK, BIRMINGHAM B29 7ER

Tel: 021-472 7610

The Dragon means business

Brian Cadge examines a suite of professional business programs

THE ROLE of the Dragon in the UK market as far as games are concerned must now, sadly, be at end. If the Dragon is to survive here it will be as a complete introductory system to professional software. This, it seems, is the view taken by London-based Compusense, who are committed to the Dragon computer with the FLEX and/or OS-9 Operating System.

Compusense are now marketing a complete set of small business packages to run under the OS-9 Operating System. The packages are in two volumes. Volume one contains Invoicing and Stock Recording and volume two contains Sales Ledger, Purchase Ledger and Labelling.

All the programs are intended to make up an integrated set and some share common files (such as the 'Item File'). The programs were originally coded in BASIC-09, which is also available for OS-9, and were marketed by Dragon Data. However, almost before they were released Dragon Data went down and the rest is history.

Each individual program of the package is on a separate disk, making a total of five disks for the two volumes. Running any of the programs requires the OS-9 system disk to be booted and the RUN51 command to be entered. This sets up the 51-column display and loads in the BASIC-09 run-time package. Instructions are then displayed to change the system disk for the program disk, the particular program then autoruns.

An unfortunate feature of all this is that to change from one program to another, for example from the Sales Ledger program to the Invoicing program, the machine has to be turned on and off and the system rebooted. It is not possible to swap programs from within the package, and even using the 'Closedown' option, which returns the OS-9 command prompt, does not help as reusing the RUN51 program tends to be unreliable. To be fair this is probably more the fault of OS-9 rather than the software, and the same package running under FLEX would not have such problems.

All of the programs are menu driven and use the 'form-fill' approach to entering data. Sensibly, all of the programs use the same format, and the first thing that greets you after a fair amount of disk activity is a main options menu.

The first thing to be done with each package is the setting up of your companies particulars. The program allows you to specify a company name, address, telephone number, VAT rate and so on, as well as allowing automatic linking to other packages, such as the Sales Ledger and Stock Recording from within, for example, the Invoicing system.

Briefly the various programs in the

package allow you to do the following. The Stock Recording system allows Transactions to be entered as either sales, requisitions, returns, or scrapped, for transactions issues, and for receipts as either purchases, returned requisitions, or returned sales. Once the files are set up they can be changed at the individual record level, or at the product group level. There are also quite sophisticated enquiry options. The transaction entry format is the same for all types and again is form-fill.

The Stock Recording system offers a number of reporting facilities, including stock listings and valuation, a listing of slow moving items, a re-order list, and usage history of items. Simple transaction listings can also be produced by either item, or transaction type. The reports are output to the printer. The system menu allows selection of either single sheet feed (for daisy wheel), or continuous feed (for fast matrix).

The purpose of the stock recording system is really to maintain quite sophisticated records of stock and to provide genuinely useful file enquiry and statistic options.

The Invoicing system allows the entering of all invoicing details. The Customer file can be copied across from the disk used for Sales Ledger and invoicing details can also automatically be 'posted' to the Stock Recording and Sales Ledger programs. This is available on a single drive system, but requires a fair amount of disk swapping. It is made much simpler by the use of a double disk system.

The invoices file can be as long as there is disk space, and can contain any number of entries for each invoice for a particular customer. Again all entry uses the form-fill approach with the lack of dynamic editing. The 'Item File' is also maintained by the Invoicing system. This contains an item number, description, sale price, and unit of measure (such as 'each' or 'per foot') for each product of the company.

Printing Invoices is quite straight forward. Following yet another on screen menu, the user may select either plain or company headed paper, choose to print only those invoices previously unprinted, and to start and finish at particular invoice numbers.

So much for volume one of the software; volume two contains three disks — sales and purchase ledgers and labelling. The sales ledger program is based on a Financial Year of 12 periods, each either a calendar month or other period to suit the user. The programs use the OS-9 system date as the default, and also check that any other dates entered are reasonable compared to this.

Two files are used by the Sales Ledger

system — the Customer Account file, and the Transaction File. The program allows the recording and audit of transactions made between the company and customers, as well as providing VAT information and the usual file interrogation facilities. A certain amount of credit control is also available through Debt Ageing and Credit Limits.

Enquiry options include the ability to list all overdue accounts, accounts whose credit limits have been exceeded, as well as company ledger summaries and company turnover analysis.

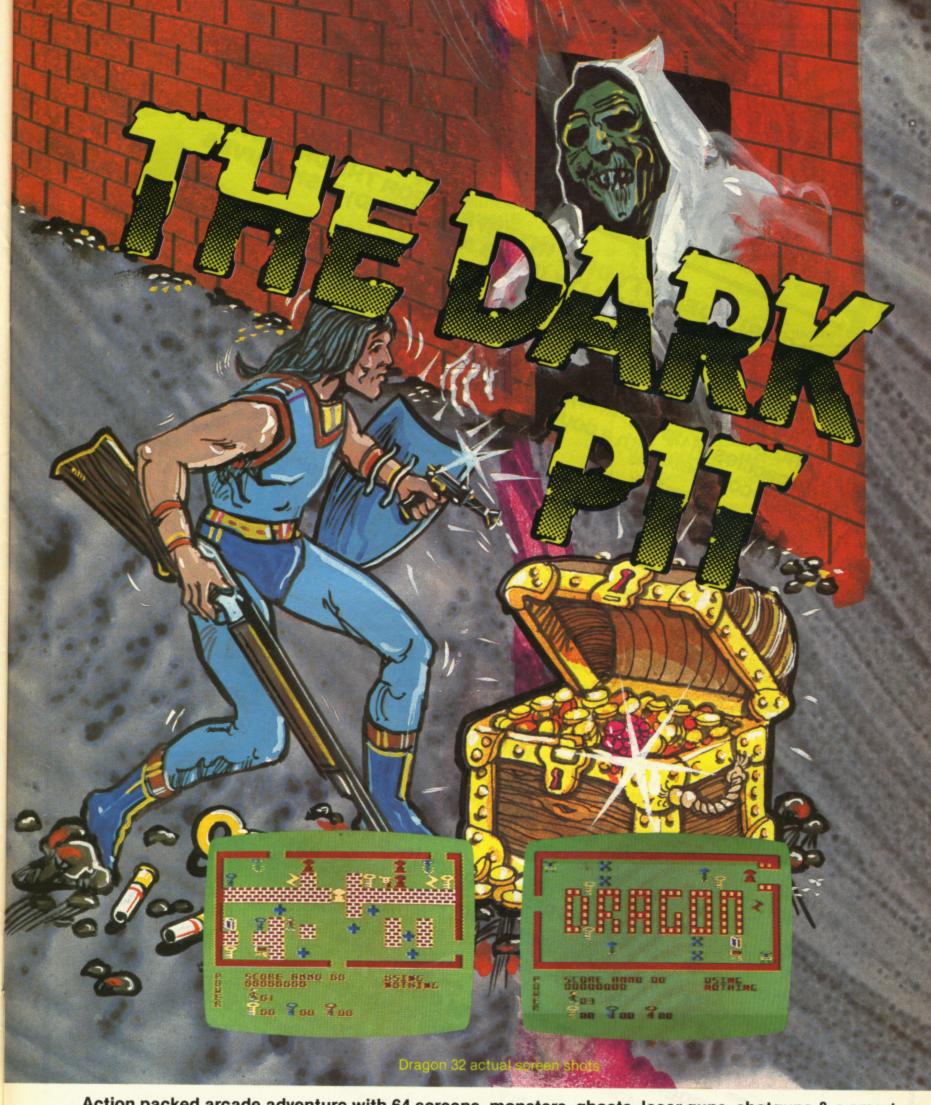
The Purchase Ledger system uses exactly the same approach as the Sale Ledger system. In addition, cash flow analysis and report facilities are available. Three files are used by the system. These are the Supplier account, the Transaction file, and the Analysis Code file. This last file contains details of the codes used within the system for analysing purchases. Some of the codes are preset to useful values, such as 10 = rent, 40 = legal expenses, but all 100 codes can be changed by the user.

Finally, the labelling system performs a fairly obvious task. The system uses only one file, the Labelling Account file, but data can also be taken from the Sales Ledger, Purchase Ledger, and Invoicing Systems. Labels can be printed selectively by category if printed from the internal Labelling Account file. The various parameters for the label types may be set up, allowing different sizes of labels.

As a complete system, this package seems really suited to the small- to medium-sized business. All interaction is via clear menus and form-fill. Excellent use is made of the OS-9 51-column display throughout. It is nice to see a package written specifically for the Dragon under OS-9. The big criticism I have to make concerns the Break key. This is all too easy to press, and if you do you are met by an error message and the OS-9 prompt. There is no way to get back to the package except to reboot, and the files may have been left in an indeterminate state. The need for regular backups is obvious. Having said that, the system performs excellently otherwise, if you can stand the rather long periods of disk activity between some options as programs are swapped in and out. Again, this is really the fault of OS-9, and not the package itself.

I have only skimmed the surface of the facilities offered by the various programs. An in-depth look at each would simply be re-writing the excellently laid out manuals, and would serve little purpose.

This is a very professional package, and really marks the way forward for the future of the Dragon 64 in the UK.

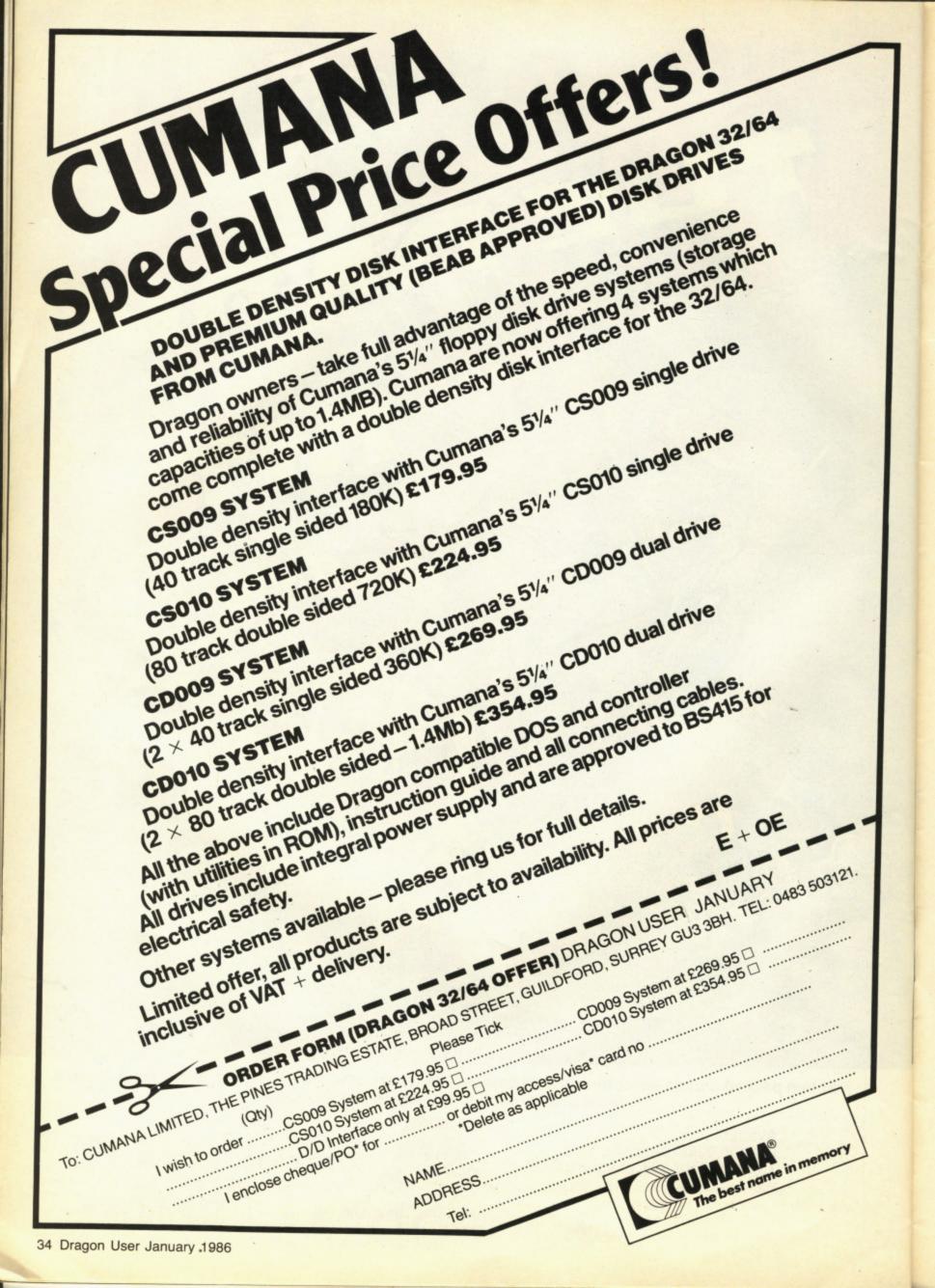


Action packed arcade adventure with 64 screens, monsters, ghosts, laser guns, shotguns & a smart bomb. Tandy version will run on Dragon 32/64

Available for Dragon 32/64 cassette £8.00 Tandy colour 32K cassette £8.00 Post & Packing 75p

or Use our 24 hour Mail Order Service
0726 68020 By post to

41 Truro Rd St Austell, Cornwall PL25 5JE



COTSWOLD COMPUTERS

ADVICE FREELY GIVEN — WE CARE ABOUT YOU!!!



PRESTEL FOR YOUR

32 and 64

Complete System — Ready to go Prism 1200/75 1000 Modem Cartridge RS232 and software Log on/off Print Frame Terminal Mode Download Save/Load Frame Off Line Buffer

All for only £79.00 Apart from Prestel there are approx 30 other bulletin boards etc. operating at 1200/75 baud

Ring "Freephone Prestel" for details of joining Prestel

CUMANA DISC DRIVES Try our prices

WE ALSO SELL

APRICOT COMMODORE 64

AMSTRAD SPECTRUM

OS-9 "MODEM"

DISC COMMUNICATION SOFTWARE

A comprehensive OS-9 communication program. Uses include computer-to-computer links, Telecom Gold, Easylink, Telex and Electronic Mail, bulletin boards and Prestel (London STD code number). Facilities include:

- 51 × 24 display with upper and lower case
- 2. Off-line file preparation send lengthy documents at the push of a key
- 3. 32,000 character buffer (download and
- 4. Incoming text can be spooled to disk for further editing and subsequent printing
- 5. 7 and 8 data bit toggle
- 6. Parity selection (No, Odd, Even, Mark, Space)
- 7. Supports Xon/Xoff
- 8. Manual and full user support

MANY SATISFIED USERS - JOIN THEM

£29.95 inc VAT and delivery UK Delivery to Europe and United States add £4

DRAGON 32

Bulleting Board 300 baud package RS232 and cassette software and leads £60 inc VAT and UK delivery.

	_
DYNACALC	£29.50
STYLOGRAPH	£42.00
RMS	£29.50
BASIC 09	£24.50
EDITOR/ASSEMBLER/DEBUG	£37.00
CCOMPILER	£37.00
PASCAL	£37.00
STOCK RECORDING	£29.50
CASH + VAT	£29.50
PROGRAMMER'S MANUAL	£19.95
Please add £1 post and packa	ne UK

PACE HARDWARE

EPROM PROGRAMMER £69.00	0
SIDEWAYS ROM £39.00	
EXPANSION SYSTEM £129.00	0
S.A.E. for further details	
Prices include VAT, add £2 postage	

BROTHER HR5 PRINTER

Save 30% on this popular printer. A4 paper — single sheet or roll. Supplied with 3 ribbons, mains adaptor and set of batteries (yes it's portable). Can also print on thermal paper.

Price inc. cable, VAT and delivery. £112

Pair Analogue Joysticks £9.95 inc. de-

Access: 6 Middle Row, Chipping Norton, Oxon. Tel: 0608 41232: Leasing







KAMA CARZY

Guide your car around a maze 36 times the size of your screen, collecting flags and avoiding boulders and Kamikaze cars. 10 screens — 5 levels of difficulty.

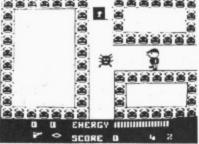




THE MASTER After years of meditation and training you may become a Master of the Art. Practice and more practice is what you will need to complete this

Joystick





BROCKS KINGDOM

A long time ago, when witchcraft and magic were the in-things, there lived a wizard called Brock. Brock was a very powerful wizard and ruled over a large kingdom. Over the years he had collected a huge fortune but his most prized possession was the rimstone ruby which held the secret of eternal life. To protect the ruby he placed many evil creatures around it with orders to kill on sight. £1.99

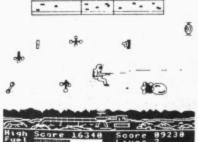
CREEPIES

The Creepies have revolted. No longer will they stand for being stamped on, sprayed and poisoned — they will have their revenge!

TO BOLDLY GO

THE FINAL FRONTIER — Kirk, Scottie, Spock, McCoy — Act out your own adventure with three Star Voyagers in the Starship ENTERPRISE. Up to 4 players.

Both Games on one Tape. £2.99



STARMAN JONES

Having negotiated all the "Caverns of Chaos" our Hero "Jones" has now strapped on his back pack and attempts to blast his way through hoards of Alien Life Form.

Use the Fore Aft Radar Scanner to help him. £3.99 Joystick



THE WIZARDS LAIR

Search the many screens for the Artifacts which were lost many years ago. Use your spells carefully, the Guardians are meaner than you think — the GOLDEN KEYS will reveal all!

Joystick

£3.99

SEWER RATS

Get to the Sewer Exit before the demon infested sewers get you. Lay traps — beware of the Sewere Gas.

RAIDERS

The Professor left his quest for the lost Artifact a long time ago and has not yet returned. Has he met with FOUL PLAY?

Both Games on one Tape. £2.99



DETONATE

Jet Pack your way through high explosive. One false move and you will Detonate. Quick timing is essential in this game. — ARCADE GAME.

THE ALIEN

It is somewhere aboard you Space Ship waiting for you in the Dark Recess - will it be your turn next? Who knows! TEXT ADVENTURE £2.99

Both Games on one Tape

*These games are available for the Tandy Color 32 Computer at £3.99 each.

ORDER NOW DIRECT FROM THIS COMPANY OR ASK AT YOUR LOCAL DRAGON STOCKIST, PLEASE ADD 50p POST AND PACKING PER GAME. SEND S.A.E. FOR FULL LIST OF SCREEN SHOTS. WE NOW HAVE 17 TITLES.

BLABY COMPUTER GAMES

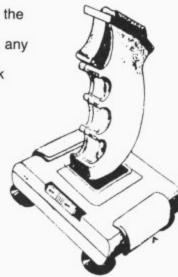
CROSSWAYS HOUSE LUTTERWORTH ROAD, BLABY, LEICESTER TELEPHONE: 0533-773641. TELEX: 342829 DYNA-G





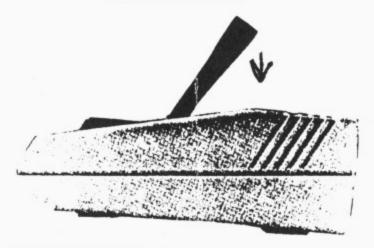
WE'RE THE DRAGON SUPER-DEALERS!!

New from Peaksoft — the amazing GUNSHOT
AUTOFIRE — beyond any doubt, the most responsive arcade joystick we've ever tested on the Dragon. Twin fire buttons, AUTOFIRE SWITCH, rocksteady suction cup base. CSP £16.95.
OUR PRICE £13.95
POST FREE!!!



(illustrated) The world's most popular joystick — over 4 million in use! Features identical to Gunshot. CSP £14.95.

OUR PRICE £12.95 POST FREE!!!



PRO-STICK POTENTIOMETER JOYSTICK

Top quality floating joystick, suitable for ALL Dragon games, and incredible value for money. (This type is essential for classic games such as Tim Love's Cricket and Worlds Of Flight.) RRP £11.95 a pair. OUR PRICE £5.50 each, £9.95 a pair POST FREE!!!

POWER PACKS — £14.95 POST FREE CASSETTE LEADS — £2.50 POST FREE AERIAL LEADS — £2.50 POST FREE

BOOKS — THE BEST DRAGON BOOKS ON THE MARKET, AT GIVE-AWAY PRICES!
Advanced Sound and Graphics (RP £5.95)
Artificial Intelligence (RP £6.95)
Dragon Gamesmaster (RP £5.95)
Working Dragon (RP £5.95)
Dragon Trainer (RP £5.95)
OUR PRICE — 1 book for £1.80, 2 for £3.40, 3 for £4.80,

4 for £5.95, 5 for £6.95 POST FREE!!!

TO ORDER — Just note your name, address and goods required on the back of your cheque or PO. Visa and Access card holders may phone their orders at any time

(minimum credit card order £5). Peaksoft games are available from John Penn Software.

PEAKSOFT 48 Queen Street, Balderton, Newark, Notts NG24 3NS Tel 0636 705230



THE BEST PRESENT YOU CAN BUY YOUR DRAGON THIS CHRISTMAS IS.....

the dragon's claw



With the Dragon's Claw Interface from Lucidata you can ADD a BBC 'B' user port AS WELL AS a Centronics port to your Dragon 32 or 64 computer WITHOUT sacrificing your expansion slot

- With a Claw you can connect a whole range of exciting peripherals, previously only available for the BBC micro.
- With the Snap-Dragon vision system, you can capture pictures, store them, animate them or process them how you like.
- This month your Dragon can take its first steps into Experimental Robotics. With the Servo Controller starter kit you can control your own toys, models or machines. Or you can try a complete three axis Robot Arm to get your ideas moving. Put an Arm at the end of your Dragon's Claw and start exploring the World!

AVAILABLE NOW from LUCIDATA LTD. P.O. BOX 128, CAMBRIDGE CB1 1DQ Tel. (0223) 356846 VISA and ACCESS cards accepted.

Dragon's Claw interface £29.95 inc VAT, P&P.
SNAP Camera £149.95 inc VAT, P&P.
Controller + Two Servos £79.95 inc VAT, P&P.
Three Axis Robot Arm £115.00 inc VAT, P&P.

TO GRAB YOUR IMAGINATION!

PRINTER CONTROL

Versions available for 6, 7, 8 and 9 dot printers. Also daisywheels and electronic typewriters.

--*-

What the customers say:

"A joy to use!"

"At the price, it's a gift!"

"Why can't all utilities be this easy to operate?"

"DŮMPĚŘ"

High speed — relocatable machine code program to print and magnify any or all of your hi-res screen. Accessible from your BASIC program — full instructions and examples supplied. Operates with or without DOS in any mode.

-*-*-*-*-*-*-*-*

Currently 49 different types of printer. If you think you've No. 50 give me a ring.

-*-*-*-*-*-*-*-*-*-*
PRINTER CONTROL (DRAGON DOS):
£19 + £1 p&p

PRINTER CONTROL (CASSETTE):
£15 + £1 p&p

DUMPER £5.00 + 50p p&p

Please state printer type when ordering. For more than one program just take the higher p&p total.

Write or phone for free quote and advice — no obligation. all software covered by unconditional money-back guarantee!

MacGowan Consultants

6 Arnhem Drive, Caythorpe, Nr Grantham Lincs NG32 3DQ (0400 72085) REAL VALUE FOR MONEY SOFTWARE

If you've got a technical question write to Brian Cadge. Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Dragon Answers

Missing Memory

I HAVE purchased a 64K Dragon computer and on Print Mem the computer shows only 32K, could you tell me how I get to the other 32K? Secondly I am in the process of developing some hardware, and would like to know which pins on the 6809e microprocessor correspond to 02 clock and VMA as on the 6800.

> Mr Mark Brooke 'The Knowle' 25, Bings Road Whaley Bridge Nr. Stockport Cheshire

THE ANSWER to your first question is simple, just type EXEC immediately after power up. Although the 6809e can interface with all 6800 peripherals and is upwardly software compatible, the pin outs of the two CPUS are not identical. The 6800's '02' connection (pin 37) is similar to the 6809's 'E' connection (pin 34). The 6800's 'VMA' (pin 5) stands for 'Valid Memory Address' and goes high when the address bus is valid. There is no direct equivalent on the 6809 the address bus is valid on the leading edge of the 'Q' (pin 35) timing signal. Note that 'Q' is not the same as '01' on the 6800.

Disc Commands

I HAVE just purchased a Dragon Data disk drive unit but find the accompanying manual a little vague!

Can you tell me how to convert saving and loading data routines from tape to disk? I have tried using FWRITE, FREAD, FLREAD, and SWRITE without success. My main use is with a standard database programme and I wish to save and load data on to disk instead of tape.

John Booth Aylesbury Bucks.

THE MOST common cause of confusion in this area is the FWRITE command. Unlike PRINT #-1 it does not automatically include commas between data items. For most programs the



following conversions will work: **Cassette Command**

- 1) OPEN "I", -1, "filename" 2) OPEN "O", -1, "filename" 3) INPUT #-1,A,B,A\$
- LINE INPUT #-1.AS
- PRINT #-1,A,B,A\$
- EOF (-1) 6)
- 7) CLOSE #-1

Disk Command to Substitute

- 1) FNS="filename"
- 2) FN\$="filename"
- FREAD FNS:A.B.AS
- 4) FLREAD FNS;AS 5) FWRITE FNS;A,",",B,",",AS
- 6) EOF (FNS)
- 7) CLOSE

Man of Letters

I WAS wondering if you can help me on a problem that has arisen in respect of The Dragon and OS-9.

The problem is that I would like to have a disk for the 'spellcheck' utility but I find, even following all the instructions in the OS-9 guide. I cannot delete files not associated with Spellcheck.

> Greg Holmes St Thomas' Hospital London SE1

THE SPELLCHECKER program is certainly worth putting on a separate disk, the following procedure will produce a working Spell Disk:

- 1: From the OS9 disk use LOAD to load MAKDIR, COPY, BUILD
- Format a blank disk
- With the blank disk in drive type MAKDIR CMDS followed by MAKDIR STY
- 4: Create a file SUPP containing any one word using the BUILD /DO/STY/SUPP command.
- 5: Insert the Stylograph disk and copy the following: COPY /DO/CMDS/SPELL /DO/

CMDS/SPELL -S #32K COPY /D0/STY /DICT /D0/STY/ DICT -S #32K COPY /DO/CMDS/COPY /DO/ CMDS/COPY -S #32K COPY /DO/CMDS/DEL /DO/ CMDS/DEL -S #32K COPY /D0/CMDS/RENAME /DO/CMDS/RENAME #32K

Track Trouble

COULD YOU please tell me why the command DSKINIT 1,1,80 does not set up a 90 TPI disk with 80 tracks? I own the double disk drives with the Dragon DOS manafactured by Dragon Data.

Mr T Robinson 112 Threefields Ingol Preston Lancashire

THE DRAGONDOS cartridge can support 80 track drives, but to format a disk to 80 tracks you must have an 80 track drive connected. The standard Dragon Data drives are only 40 track and can only format up to 40 tracks regardless of the type of disk used. It is not advisable to use the DSKINIT command as you describe as this could potentially damage the 40 track drives.

Sprites

I HAVE been writing a game in machine code which uses 'sprites' produced by using 'exclusive oring' (EOR instruction). But no matter how fast I update the characters they always seem to flicker can you suggest why?

Phil Parkes

THE REASON for the flickering graphics is that you are not syncronizing the drawing and undrawing of the graphics to the Cathode Ray Tube of your TV.

If you 'move' the graphics whilst the screen is not being drawn (during the 'Frame Fly-back' of the TV) then the picture will not flicker. This is simple to achieve by adding the following few instructions before your routines to update the screen; WAITTV LDA \$FF03

ANDA #128 **BEQ WAITTY**

What this does it to wait until bit 7 of location \$FF03 is high - this is the 'Field Sync Interrupt Flag' and goes high when the CRT has finished drawing a screen and is returning to the top of the screen.

Hi-rise

IS THERE any way of loading a Basic program (eg a dissassembler) above a machine code program? I have tried POKEing 25 to 28 with a higher address but get SN error when trying to RUN the Basic, whilst resetting POKEs 25 and 26 with their original address loses the Basic.

Incidentally, I have discovered a function of the Editor not mentioned in the manual. Typing a numer 'n' and 'spacebar' moves the cursor n characters along the line being edited.

Brian Beesley. Eastleigh.

TO LOAD a Basic program above a machine code program I suggest you do the following:

Use the CLEAR statement to set top of RAM (eg CLEAR 200, &H3FFF). Now load the machine code at &H4000 upwards, then POKE 25 and 26 with the first free byte available after your machine code. Type in CLOAD. Locations 27 and 28 will now be the right values.

The reason for the SYNTAX ERROR on RUN is that the first byte of Basic must always be 0. Therefore you should find the first free byte of Basic and POKE it with 0.

However, please note that if the program uses variables, these variables will be stored at locations pointed to by 29 and 30. If 29 and 30 point to just beneath your machine code program or any other storage area, the program may be overwritten by the variables.

Brian Cadge explores the Dragon's ROM in a special series which builds up month by month into a firmware manual.

This month we cover the control of Basic variables (simple numeric and strings). This information will be of use mainly to the programmer who wishes to add new commands/USR routines to Basic.

Variables Memory Map

THE FOLLOWING locations are used by Basic for storing information regarding the state of numeric and string variables. It is not advisable to change the contents of these addresses from Basic, although they may be PEEKed where useful.

- 6 Variable Type Flag. Signifies the type of variable encountered; this is 0 for numeric and 225 for string.
- 27/28 Start address of simple variables table in RAM. See below for an explanation of the format of this table.
- 29/30 Start address of array table in RAM.
- 31/32 End of storage in use. This points to the last byte being used by Basic.
- 35/36 Top of free string space. Note that by subtracting the contents of 33/ 34 from this you can obtain the amount of free string space left and so prevent OS errors.
- 49/50 Line number of current Data statement.
- 51/52 Address of next item in the current Data statement.
- 55/56 Pointer to variable last in use.
- 57/58 VARPTR address of variable last in use.
- 79–84 Floating Point Accumulator number one.
- 82/83 Part of FPA1 used in assignment of 16 bit variables and strings.
- 92-97 Floating Point Accumulator number two.

The VARPTR address of a variable points to the five bytes which hold the numeric value of that variable, or point to the start address of a string. It is the same address returned by the Basic VARPTR command.

The format of the variable table is as follows. Each variable entry takes up seven bytes. The first byte is always the ASCII code of the first character of the variables' name. The second byte is the ASCII code of the second character of the variables' name, or zero if the name is only one character long. For a string variable bit 7 of this byte is set (ie has 128 added to it).

The next five bytes depend on whether the variable is string or numeric. Numeric variables are stored with their binary exponent in the first byte, followed by the value of the mantissa. The most significant bit of the mantissa is set if the value is negative. For a string variable, the first of the five bytes contains the length of the string (0–225) and the third and fourth point to the start address of the string, which may

be either in the program area (for constants) or in string space.

A simple way of adding commands to basic is to use the EXEC command followed by a number of parameters, if the address of the routine is stored in a variable. For example, 'SAY' if the command was to control a speech synth the format could be: EXEC SAY,A\$,3

The first part of the routine needs to call the CKcoma routine to skip the comma after the routines address, and from there on all the routines used by normal basic commands to evaluate strings and numbers can be used on the parameters given.

Firmware Routines for Variables

The following routines can be used for creating, accessing and deleting variables. All addresses are in decimal and are given for both the Dragon and Tandy machines.

GetExpr Dragon 34935 Tandy 45382 This routine will evaluate and put the VARPTR address of the expression which follows into locations 82/83.

GetStrg Dragon 34951 Tandy 45398Compiles a string and places it in some free string space. This routine should normally be followed by a call to GetExpr to get the address of stored string.

CKcoma Dragon 35242 Tandy 45677 Reads in the next significant character on the command line, and checks that it is a comma. If it is not then a Syntax Error is produced, otherwise the routine simply returns.

CK-clbrak Dragon 35236 Tandy 45671

As for CKcoma, but checks for close bracket character ')'.

CKopbrak Dragon 35239 Tandy 45674

As for CKcoma, but checks for open bracket character '('.

CKchar Dragon 35244 Tandy 45679 As for CKcoma, but checks for the character in the B register.

GetVar Dragon 35476 Tandy 45911 Gets the VARPTR address of the following variable name (not expression), and places it in locations 57/58. The variable type is placed in location 6.

GetUSR Dragon 35625 Tandy 46057 Returns the value of the argument given in a USR function as a 16 bit number in the D register.

Assign-8-bit Dragon 35894 Tandy 46323

Assigns the value in the B register to a numeric variable. This routine also returns to the basic processing loop and so should be entered at the end of a function routine, or USR routine, using a JMP.

Assign-16-bit Dragon 35893 Tandy 46322

Assigns the value in the D register to a numeric variable. Entry conditions are otherwise as for Assign-8-bit.

Assign-16-bitB Dragon 39998 Tandy 34830

An alternative routine to Assign-16-bit. This assigns the value in locations 82/83 to a variable. Entry conditions are otherwise as for Assign-8-bit.

Garbage Collect Dragon 36055 Tandy 46481

Forces a controlled garbage collection of string space. This routine can be called from basic (EXEC) or machine code to control when the 'pauses' occur when using large volumes of string space.

DelVar Dragon 36255 Tandy 46681 Frees the space taken up by a variable. On entry the X register must point to the VARPTR of the variable to deleted.

Get-8-bit Dragon 36433 Tandy 46859 Returns the value of the following number in the B register. If the number evaluates to more than 8 bits then an FC error is produced.

Get-16-bit Dragon 36483 Tandy 46909

Returns the value of the following number in the X register. If the numer evaluates to more than 16 bits then an FC error is produced.

This is the fifth in Brian's series on the Dragon's Rom routines. Next month he will be covering Firmware Vectors.

If you have missed any of the previous issues, they can be obtained from Dragon User, Back Issues, 12-13 Little Newport Street, London WC2H 7PP, at £1.25 each, inclusive of postage, packing and administration charges.

Just to remind you of previous months: Sept 85 — Cassette Operating System Oct 85 — COS Firmware Routines Nov 85 — Text Manager Routines Dec 85 — Graphics and Sound

Wizard

Software

COMPUTA FRUITA

A de-luxe fruit machine simulation presented in colourful high resolution graphics featuring: 4 drums. Spin. Respin. Hold. resolution graphics featuring: 4 drums. Spin. Respin. Hold. Gamble, Collect, Nudge, Bounce, Blind. Cancel, Jackpot, Hi-Lo. Bonus, and Auto-Win. New drums manufactured for each game.



WIZARD PINBALL

A de-luxe all machine code pinball simulation in colourful high resolution graphics featuring: Flippers, Bumpers; Gates, Bonus Balls, Bonus Scores and Magnetic Hold.

£3.95

A machine code implementation of the low level teaching language CESIL which is widely used in schools to teach 'O' level candidates the funamentals of assembly language programming. Instruction manual supplied.

JUMBO'S TROUBLES

A 100% machine code game presented in high resolution graphics. Guide JUMBO, an animated elephant, up and down the ladders in the house to collect a variety of household items. Beware of the revolving screws and Nokos which inhabit the house a they will try to stop you from repossessing their goods. Score, high score, lives remaining and bonus points are continuously

SPACE CASTLE

A 100% machine code arcade game presented in colourful high resolution graphics. Management your space ship and blast a hole through the 3 rotating space rings which defend the space castle to destroy the space city. The space city is also defended by lasers and zappers. 30 levels of difficulty. One joystick required.

Also available:					
TIME PORT 1	£6.45	EVICTOR	£4.95	CRAZI PLUMBER	£3.95
TIME PORT 2	£6.45	RED ALERT	€4.95	SMASH	£3.95
DRAGON STARTREK	£6.45	ALIENS +	£4.95	STARWORD	£2.95
STRATEGY	\$6.45	TRACE CHASE	€4.95	TRIPLET	£2.95
DECATHLON	€5.95	CLOWNS	£3.95	SIRIUS IV	£2.95
STARTING FRACTIONS	€5.95	DISMON	£3.95	WIZARD	\$2.95
TOUCHDOWN	65 95				22.00

All prices inclusive, mail order, cheques or postal orders to:

WIZARD SOFTWARE, DEPT. DU, PO BOX 23 **DUNFERMLINE, FIFE KY11 5RW**

Send large SAE (7in × 5in) for full program catalogue Royalties paid for machine code DRAGON software

H.C. ANDERSEN COMPUTER R/S

HIGHLY RELIABLE SOFTWARE and HARDWARE

DS80 (double sided 80 track driver and booter) upgrades your SS40 OS-9 Operating System floppy disc to a DS80 OS-9 Operating System floppy disc. Invert the drive select and you can BOOT from the new OS-9 Operating System: You have now one million byte effective disc capacity on your DRAGON and you can read and write on standard OS-9 floppy disc.

Requirement: one 40 track (step rate 6ms) drive and one 80 track (step rate 3ms) drive. £29.95

STEP-TWO converter lets your 80 track (step rate 3ms) disc drive read and write 40 track floppy discs. Just put it on the disk flat cable. Power supply +5V via the disc flat cable from the disc controller £49.95

Floppy Disc Drive 80 track double sided, step rate 3 ms, double density, capacity one million bytes. £189.95

CAD dMODEM (dragon MODEM) telecommunication/ transmission program running under OS-9. CAD dMODEM will communicate with nearly any computer. Will receive lines up to 82 characters (the line will slide left when 51 characters is reached. Internal buffer of app. 10,000 characters. Send/Receive Text and Binary files. Dump diaglog to buffer. Examine buffer. Dump buffer to disk for later printing. Will communicate safely up to 4,800 baud full duplex. Manual included. £119.95

We stock software and hardware for OS-9, FLEX and UniFLEX.

Prices exclusive VAT. 12 months guarantee on software and hardware. Postage and packing add 10% for hardware and 5% for software. Send cheque made payable to: DRAGON DISTRI-BUTOR in DENMARK. Credit by Eurocard and Mastercard.

H. C. ANDERSEN COMPUTER A/S

Amager Strandvej 418 DK-2770 Kastrup
Telephone: 01-52 44 04 Telex: 31484
OS-9 is registered TM of MICROWARE and MOTOROLA, USA FLEX, UniFLEX is registered TM of TECHNICAL SYSTEM CONSULTANTS, USA CAD is registered TM of H. C. ANDERSEN COMPUTER, Denmark

E17.25 + 75P P&P Per order

THE NEW DE-LUXE TOP VALUE LIGHT PEN

FOR THE DRAGON 32/64

THE NEW ADVANCED PROGRAM

for the Trojan light pens include the following facilities-

- * DRAW BOX
- * DRAW CIRCLE
- * DRAW LINE
- * DRAW PICTURES FREEHAND
- * COLOUR FILL DESIGNATED AREAS
- * SAVE AND LOAD PICTURES TO AND FROM TAPE
- FULL ERASE FACILITIES

All in Hi-Res screen in any of 4 colours for the Dragon 32/64.

Now available from exclusive

distributors MICRODEAL

Use our 24 hour MICROPOST service by post to:

41 Truro Road, St. Austell, Cornwall PL25 5JE

By phone with credit card









0726 68020





GAMES PLAYING

This is a first class program which gives hints and tips on how to write programs for the pen. Ideal for many educational uses.

A top quality pen plus a first-class program. The best value pen package available.



Classified

DUST COVERS

★ DRAGON 32 & 64 ★

made-to-measure in quality natural vinyl with cut-outs for terminals and leads. Just send £2.95 (no stamp required) to:

ALLEN ENTERPRISES Freepost, Luton LU2 8BR

Trade enquiries welcome

ADVENTURE — £3.95. 'Underbeings of Croth' begins deep below ground in a strange land of misty valleys, Pit Dungeons and Toothworms. The adventure has 86 locations, understands 165 words, uses hi-res upper/lower case text, and allows commands like 'Pick fruit then eat it'. Money back if unsatisfied. Available only from MARI-DIAN, Birchmore Cottage, Nairdwood Lane, Prestwood, Great Missenden, Bucks HP16 OQQ.

BOARDROOM. DRAGON 32, superbly realistic game of business intrigue and skill, only £1.95 inclusive. Mike Lovell, 40 Mentmore Crescent, Dunstable, Beds LU6 3NN.

NEW DRAGON 32s, only £49.50 + P&P while stocks last. 023973-472 or 023973-387.

BRITISH BATTLESHIPS 1892-1960. CBM64. Four referential/educational cassette volumes £2.85 each or information from C. Lewis, 84 Station road, Wraysbury, Berks TW19 5NH.

DRAGON 32, data recorder, six tapes, two joysticks, £110. 01-595 7161, evenings.

FOR SALE. Dragon 32 + manual, cassette recorder, joysticks, software, etc. £75. Woking (04862) 71318.

DRAGON 64, with software, magazines, £124. Telephone (075 855) 271.

DRAWCASTER DRAGON pools forecasting system, score-draws and homes, British leagues, £6.50. Acepak Software, 3 Brooks Road, Formby, Merseyside L37 2JL.

ASTROLOGY for beginners

Special Starter Pack for only £11.50

Consists of a simple program to calculate a horoscope, an introductory booklet and two self-teaching programs (how to interpret the horoscope)

No previous knowledge required

For the Dragon/Tandy Color and many other home micros. Also wide range of programs for more experienced astrologers

Cash with order (add 50p outside UK) or large sae for free catalogue to:

ASTROCALC (Dept DU) 67 Peascroft Road Hemel Hempstead, Herts HP3 8ER. Tel: 0442 51809

DRAGON 32, Delta DOS with built-in assembler and disc drive. 80 column printer, joysticks, software, books, etc, £320. Write: Ian King, Roma, Salisbury Lane, Middle Wallop, Stockbridge, Hants.

DRAGON 64, cassette player, selection of books. Excellent condition, £125. Aylesbury 641472.

DRAGON 32, in original box plus adapter, dust cover, joysticks, games, books. Offers. Phone 068-685 283.

BLACK TOWER * CLIFF HOUSE. Two mysterious new adventures (reviewed November 1985). Special introductory price! £3.95 each. £6.95 both on one tape. 0592-262574.

4164 DRAM, £1.75 each. 74LS783, £10.25. 6809E, £4. 2764, £2.50. 8255, £2. 4013B, 10p. 4116-150NS, new, 75p, used (working), 40p. Dragon 32 updates to 64k Dram, £35 plus p/p. Phone Nick 0892 44070 (evenings).

JOYSTICKS

For Dragon/Tandy, top quality Joysticks easier to handle and faster than others costing twice as much, £5.95 each, £10.95 the pair inc. Cheques and POs to: Peritron, Dept. DU, 21 Woodhouse Road, London N12 9EN.

DRAGON 64, disk drive, Dragon DOS, OS9, Basic 09, Edit 09, ASM 09. Cost £600. Offers please. Contact Marcus on 01-515 3919.

DRAGON 32, joysticks, cassette player, £100 software, books, magazines, leads. As new £115 ono. Phone 0661 22631.

DRAGON 64 + Quickshot II + recorder + 39 originals + 1 cart + books, mags. Cost £380. Accept £200 ono. Bridlington, E Yorks. Phone 0262 603750 after 6 pm.

WANTED: interface for Dragon 32 and ZX printer. Telephone Frensham 3387.

PRAGON 64. £130, Dragon disc drive + Dragon DOS, £150. Seikosha GP100A, £100. Medway (0634) 682749.

DRAGON 32 with lots of software, light pen, joystick etc. £75. 0239-613962.

DRAGON. Single disc drive, excellent condition, 3 months old, 1 blank disc, manual. £100 ono. Phone 0660 20434 after 5pm.

EDUCATIONAL GAMES — £3.95 each or £5.95 for both. MAZERACE (6-11 years) teaches spelling (using pictures), addition and subtraction. SPELLBOX (7-12 years) teaches spelling using a 600 word vocabulary, multiplication and division. Both use high resolution colour text and graphics. "A tribute to Dragon Basic" (D.U. January) recommended by teachers, parents, children etc... Money back if unsatisfied. Available only from MARIDIAN, Birchmore Cottage, Naidwood Lane, Prestwood, Great Missenden, Bucks HP16 OQQ.

PERSONAL SOFTWARE USERS' ASSOCIATION

Library and Swap Shop facilities for Dragon users. Huge range of titles. Only £1.50 hire charge for THREE week period.

For details send large S.A.E. to:

Dragon User P.S.U.A. 19 Lammerton Terrace, Dundee DD4 7BR

AMERICAN "Color Computer Magazine" bumper bundles of back copies, 10 back issues £9.95 inc. 6 for £6.95 inc. Loads of programs and information for Tandy Color and Dragon Users. Cheque/Visa/Access to Elkan Electronic, 11 Bury New Road, Prestwich, Manchester M25 8JZ. 24-hour hotline 061-798 7613.

DRAGON 32, 15 games, joysticks, cassette recorder, carrying case, leads, books, magazines. £120 ono. (0787) 247736.

JOYSTICK KITS. Instructions and parts supplied, soldering iron required. Floating type, £4. Self centring type, £5. Ready built add £1. 0270-585024.

FREE MEMBERSHIP software library. recent titles, cheapest prices or exchange unwanted software, S.A.E. details, M.R.V., 120 Auriel Avenue, Dagenham, Essex.

DRAGON 32, tape recorder, 20 games, joysticks. £80. Harlow 35046.

DRAGON 32, joysticks, cassette recorder, £400. Games and other software, £150 ono. Telephone (04203) 7830.

DRAGON 32, repair or exchange board as neccessary, £27 + VAT, includes return postage. Send to Computer Care Centre, Artillery House, Gunco Lane, Macclesfield. Tel. 0625 614967.

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

08.02	20.60	£0.40	£0.20
£1.60	£1.40	£1.20	£1.00
£2.40	£2.20	£2.00	£1.80
£3.20	£3.00	£2.80	£2.60
£4.00	£3.80	£3.60	£3.40
e on a separate sheet of paper	Please continue or	£4.40	£4.20

Name	
Address	
	Telephone

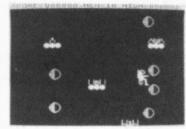
Please cut out and send this form to: Classified Department, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP



PRESENTS

ARCADE





DICKIE DEN DICKIE SPACEN	MAN 5.95
	5.95
SHAOLIN MASTER — nearest you can get to real KUNG-FU with no fear of injury £7.95	
	and 5.95
ADVENTURE	
THE SHRUNKEN SCIENTIST (Pick of the month Dragon User March 1985) £5.95	
	5.95
TOMBSTONE AND CODCREEK (Two games for 1 to 4 players only) £5	5.95
	5.95
DUPLICAS 5 — The latest version of this very successful back-up utility £7 NB: Update service available, please send old tape plus £1.50 for handling.	

Send SAE for latest catalogue
Add 50p P&P to all orders, overseas £1.25
Make cheques and postal orders payable to

QUICKBEAM SOFTWARE
67 OLD NAZEING ROAD, BROXBOURNE, HERTS EN10 6RN

GROSVENOR SOFTWARE

DRS - DATA RETRIEVAL SYSTEM

The ultimate Dragon database program, supporting files on tape or disk (Dragon DOS or Cumana 2.0). Records contain up to 480 characters each in up to 36 fields. User defineable screen displays and printer reports. Powerful searching, editing and sorting facilities. Supplied on tape with a complete gazetteer of the world as an example. £9.95

ALLDREAM — Editor/Assembler/Monitor/Disassembler
Reviewed DU September '85. "A joy to use"; "Hard to fault". Cassette
£12.95, Cartridge £22.95, Disk (Dragon/Cumana 2.0) £19.95

DREAMPRT 64 character print line adaptor for above £3.50

A PROGRAMMER'S GUIDE TO DRAGONDOS — indispensible at £2.50 RTTY (Radio Teleprinter) program. Decode Reuter's etc, directly from a short wave radio. Tape £12, Cartridge £22

Also MORSE TUTOR, MORSE DECODER and AMTOR software. SAE for details.

All supplied with full manuals. Please add 40p p&p (£1 export).

2 BEACON CLOSE, SEAFORD, EAST SUSSEX BN25 2JZ. Tel: (0323) 893378

S.P. ELECTRONICS

Strike Control Joystick	£9.95
Trojan Lightpen	£17.95
Touchmaster Touchpad	
CP 80 Dot Matrix Printer, inc. Printer Cable	
CPA 80 Dot Matrix Printer, inc. Printer Cable	
Parallel Printer Cable	
Cannon 160 CPS NLQ Printer, inc. Printer Cable	
Green Screen Monitors	

Large range of software available. SAE for free list.

Large range of spares available

Also complete repair service



S.P. ELECTRONICS, 48 Limby Road, Hucknall, Notts (Nottingham 640377)



of the hill!

The RAINBOW is the biggest and best magazine available for the TRS-80® Color, TDP-100, MC-10 and Dragon-32 Computers.

And no wonder! It's over 300 pages thick each month . . . pages brimming with programs, product reviews, tutorials, columns, hints and tips about *your* computer. Yes, it is considered "the" Color Computer magazine to buy.

Don't delay. For only \$28 you can get the Rainbow every month of the year. Then your CoCo will be Kong of the Hill too!

U.K. Subscription rates U.S. \$65 surface rate U.S. \$100 air rate

Registered trademark of Farsoft

Registered trademark the Tishby Corp.



osterCord V/SA Subscriptions to the RAINBOW are \$28 a year in the United States. Canadian and Mexican rate U.S. \$35, surface rate to other countries U.S. \$65, air rate U.S. \$100. All subscriptions begin with the current issue. Please allow up to 5-6 weeks for first copy.



Competition Corner

Answers to Competition Corner, Dragon User, 12-13 Little Newport Street, London WC2H 7PP

WITH ANOTHER New Year upon us, here is a short routine which will display the calendar for any given month between the years 1800 and 2099. Simply input the year and month and leave the computer to do the rest. Readers with printers might like to adapt the program to print out the complete calendar for any given year.

The method on which this program is based is one that is found in a number of mathematical texts, and which calculates the day on which any given date falls. The method is as follows:

Take the last two digits of the year and add to it a quarter of its value (disregarding any fraction). Then add the month value from the table below:

```
+1 (leap year +0)
                       July +0
Feb +4 (leap year +3)
                       Aug +3
Mar +4
                       Sept +6
April +0
                       Oct
May +2
                       Nov
June +5
```

Now add the day of the month that you are interested in, and finally add the 'century' value from the table below:

```
2000 - 2099
          +1 1752 — 1799 +4
1900 — 1999 +0 1700 — 1752 +1
1800 — 1899 +2 1600 — 1699 +2
```

When you have the total, divide by seven and note the remainder. This will tell you on which day of the week the date fell (1 = Sunday, 2 = Monday, 3 = Tuesday, 4 = Wednesday, 5 = Thursday, 6 = Friday and 0 = Saturday).

In the table for the month values, note that a different figure is to be added for the months of January and February for leap years only. A year is a leap year if it is exactly divisible by four. Unfortunately, there are exceptions to this rule. The 'idea' of the leap year was introduced in 46 BC by Julius Caesar when it was noted that their 365-day year was slowly regressing with regard to the seasons. (Unfortunately, the earth's stubborn refusal to orbit the sun in an exact number of days was the cause of this irregularity - and the addition of an extra day every fourth year helped to redress the balance!) This went fine until the middle of the 16th century when it began to be noticed that the equinoxes

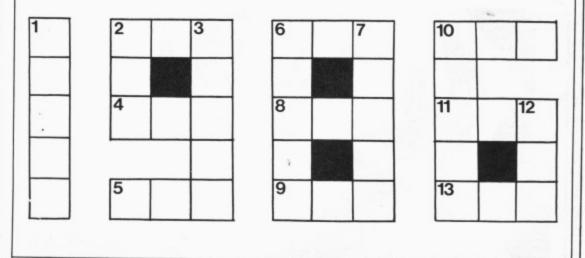
100 CLS 110 INPUT"ENTER YEAR";Y\$
120 Y=VAL(Y\$):IF Y<1800 OR Y>2099 THEN PRINT YEAR OUT OF RANGE ":GOTO 110 130 INPUT ENTER THE MONTH (1 TO 12)";M
140 IF M<1 OR M>12 THEN 130 150 RESTORE: FOR F=1 TO M: READ M\$, Q, L: NEXT F
160 R=VAL(LEFT\$(Y\$,2)) 170 IF R=18 THEN Q=Q+2 180 IF R=20 THEN Q=Q+6
190 IF Y=1800 OR Y=1900 THEN 210 200 IF Y/4=INT(Y/4) AND MK3 THEN Q=Q-1:IF M=2 THEN L=29
210 Z=INT(VAL(RIGHT\$(Y\$,2))*1.25)+Q 220 IF Z>6 THEN Z=Z-7:GDTD 220
230 CLS:PRINT:PRINT@47-((LEN(M\$)+5)/2),M\$;Y 240 PRINT:PRINT" s M T W T F S":PRINT
250 IF Z>0 THEN FOR F=1 TO Z:PRINT" *";:NEXT F 260 FOR F=1 TO L
270 IF Z=7 THEN Z=0:PRINT:PRINT 280 PRINT USING "####";F;:Z=Z+1:NEXT F
290 IF Z<7 THEN PRINT" *";:Z=Z+1:GOTO 290 300 GDTO 300 310 DATA JANUARY.1.31.FEBRUARY.4.28.MARCH.4.31.APRIL.0.30
310 DATA JANUARY,1,31,FEBRUARY,4,28,MARCH,4,31,APRIL,0,30 320 DATA MAY,2,31,JUNE,5,30,JULY,0,31,AUGUST,3,31 330 DATA SEPTEMBER,6,30,OCTOBER,1,31,NOVEMBER,4,30,DECEMBER,6,31

were occurring 10 days too late. In effect, the Julian year was still eleven minutes too long and the cumulative effect of this was to 'add' eight days every thousand years. In 1577 Pope Gregory XIII amended the leap year rule to say that the 'century' years, although by rights leap years, should not be regarded as such, but that the 'millennium' years (e.g. 2000) should be. If you find the effect of this 'fine tuning' confusing, let me add that the year is still too long by 26 seconds, so you may like to make a note in your diaries that the year 4000 will not be a leap year!

This New Year competition is based on the

crossword grid in the shape of the date '1986'. Can you select values for A, B, C, D and E, such that the expressions when evaluated will fit into the grid?

Across	Down
2. D - C	1. $E^3 - (A^2 + B^2 +$
4. $D + B - A$	$C^2 + D^2 + E^2$
5. $D + A - B$	2. (D + A)/2
6. A	3. (D/2)2
8. $A + B + C$	6. B ²
9. D	7. A ²
10. B	10. C ²
11. C	12. E ★ 9
13. A + C + D	



THIS MONTH we present a particularly seasonal offering, with a cross number puzzle in the shape of 1986. And up for grabs this time - 20 prizes of two cassettes containing a pot-pourri of programs from the Melbourne House book, Enter the Dragon. Should keep you occupied well into the New Year.

Rules

TO WIN this month's prize, all you have to do is send us the solution to the above crossnumber puzzle, using the printed clues - demonstrating how you solved it. Note - please don't send us cassettes containing your answer hard copies only!

Make sure that your name and competition, who will be receiving address is printed clearly on your entry, and mark your envelope 'December Competition' . . . or you run the risk of disqualification.

As a tie-breaker, complete the following sentence in 10 words or less: "1986 is the Year of the Dragon because . . . "

Entries must reach us by the last working day in February, with winners being announced in the April 1986 issue.

As usual, the Editor's decision is final, and no correspondence re the competition can be entered into.

Winners

The twenty winners of our October D Maddocks of Taplow.

copies of Manic Miner (courtesy of Software Projects) very soon are as

R M Gosling of Alveston, P Robertson of Co Durham, G Davey of Gourock, Brian Hughes of Hounslow, E C Hasted of Erith, J J Isherwood of Dyfed, Rachel Edmunds of Sedgefield, R G Wilkinson of Warminster, Stephen Salvin of Telford, Ken Caldwell of Rugby, F J Taylor of Acklam, B M Chamberlain of Banbury, M McDonough of Fleetwood, A J Young of Dundee, I D High of Eltham, S P Barritt of Daventry, A Wilson of BFPO 106, R G Woods of liford, B Lewell of Nuneaton, P

St. George now has two choices!

Red or green will slay the Dragon

Nylon encased-Steel shafted joystick with ball and socket joint.

▲ Fast sprung return to centre.

Graphite wiper linear potentiometers.

▲ 12 Months Guarantee.

7 day Money back Guarantee.



Made in England

DELTA 3d JOYSTICK £10.00 TWO DELTA 3d JOYSTICKS £19.50 PLEASE STATE COLOURS REQUIRED

Prices include VAT and P&P.

Voitmace delta 3d

VOLTMACE LTD PARK DRIVE BALDOCK HERTS SG7 6ED Tel: (0462) 894410

Callers welcome at the factory - Monday to Friday.

